

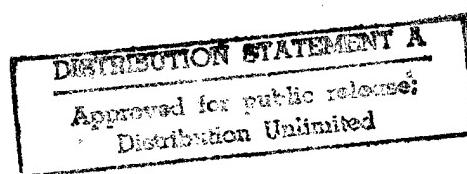
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# USSR Report

## AGRICULTURE



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3 May 1984

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AGRICULTURE**

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## MAJOR CROP PROGRESS AND WEATHER REPORTING

### MODEL CARE FOR WINTER CROPS

Dushanbe SEL'SKOYE KHOZYAYSTVO TADZHIKISTANA in Russian No 12, Dec 83 pp 10-14

[Article by S. Tsymlov, senior agronomist of the Main Administration of Farming of the Tajik SSR Ministry of Agriculture: "Model Care for Winter Crops"]

[Excerpts] The republic's kolkhozes and sovkhozes are constantly improving the agrotechnology for cultivating grain crops and the structure of sowing areas and they are introducing new highly-productive varieties and the achievements of science and progressive experience into production. This enables them to increase grain production annually. Last year 35 percent more grain was produced than the average produced in past years.

The introduction into production of new, high-yield varieties has enabled a number of kolkhozes and sovkhozes in the republic to make up for its debt related to the sale of grain to the state. This debt arose last year as a result of unfavorable weather conditions.

A no less important role in the growth of productivity and gross grain yield belongs to crop care. For the 1983 harvest winter sowing took place mainly in dry soil. Then came the rains, which encouraged shoots, but because of the absence of further precipitation a portion of these shoots perished. This resulted in sparse crops. Some fields of winter crops moved into winter without shoot formation because of late sowing. In essence such crops have become spring crops. During the winter period in practically all zones of the republic there were sharp changes in temperature, which meant that plants either began to grow or curtailed vegetation.

Such overwintering had a negative effect on plants--they grew and developed slowly. However, as a result of the use of progressive agrotechnology it was possible to mitigate this effect to a considerable degree. In Dangarinskiy, Voseyskiy, Gissarskiy and several other rayons winter crops were under the constant observation of specialists, which enabled them to take effective action with the coming of the early spring warming period to eliminate the consequences of the poor overwintering of crops.

We know that in acting on the plant it is possible to strengthen productive bushiness and obtain a large number of grain ears per unit of area

and to increase the number of grain per ear and their weight, which in the final analysis results in achieving full-value harvests for all crops.

The republic's grain farmers must take all measures necessary during the winter and early spring period to encourage the further growth of productivity and gross grain yield. In this great importance is acquired by the favorable overwintering of winter crops and by the timely and quality care for crops. First of all we should establish a constant observation of the preservation and vitality of crops. Depending on their condition crop care agrotechnology can then be utilized to produce a full-value harvest.

The resowing of winter crops in the enterprises of Dangarinskiy and Voseyskiy rayons this year produced positive results. On plots where resowing was completed as soon as the temperature rose productivity was 5-8 quintals higher than in neighboring unfortunate and non-resown fields.

Plowing is not always necessary in resowing winter crops. On medium and light soils it is best to perform harrowing across the field and to sow in this same direction at a rate of 170 kilograms of wheat or barley seed from varieties developed locally or 220 kilograms of Sete Tserros-66 wheat with a mandatory setting depth of 4-5 centimeters. If crops have been thinned less than 50 percent undersowing is employed.

The undersowing rate is determined by the degree of sparseness. Resowing or undersowing proceeds with the simultaneous introduction of carbamide at a rate of 100-150 kilograms per hectare. Seed must be of high sowing quality, no lower than second class according to the sowing standard and treated against various diseases.

Both on dry-farming and irrigated lands grain crops experience a shortage of nutrients. For this reason in order to obtain a full-value harvest it is essential to apply mineral fertilizer. During the winter and early spring period it is applied in the form of top-dressing, thereby creating more favorable conditions for the growth and development of plants, which improves productivity.

In Parkharskiy, Pyandzhskiy, Kumsangirskiy, Dangarinskiy, Pendzhikentskiy and other rayons in the republic top-dressing of winter crops should begin with the arrival of days with fine weather in January and February; in mountainous enterprises--in March. The top-dressing of winter crops, completed with good quality and on schedule, facilitates an addition in the harvest during years with sufficient precipitation as well as during dry years.

A widespread method of cultivating spike crops on irrigated land involves cultivating two harvests per year on the same area of land. This year the enterprises of Kurgan-Tyube Oblast threshed 40.3 quintals of wheat per hectare during the first harvest; in Il'ichevskiy and Dzhilikul'skiy rayons--over 50 quintals on the average.

At the same time there are many enterprises where the yield of spike crops on irrigated lands is around 20-25 quintals per hectare. The reason for such

variability in productivity is the variability in the level of agrotechnology; the size of the harvest is greatly affected by crop care.

Under dry-farming conditions during the early spring period significant losses to grain crops are brought about by pests. The dry-farming beetle is the most widespread. Chlorophos, metaphos and other chemical preparations are used to combat them. The timely exposure of pests on fields with grain crops and taking necessary measures to combat them--these are the indispensable conditions for obtaining a full-value grain harvest.

During the early spring period crops are harrowed in order to enclose and preserve moisture in the soil. This is especially important in the southern rayons of the republic, where high temperatures come early and rise sharply causing a rapid evaporation of moisture, which accumulated in winter, from the soil. Harrowing has a positive effect on productivity in other parts of the republic as well. By loosening the soil it improves the heat and air regimen of the root system and combs out the dead parts of the plant which usually act as the seedbeds of various types of diseases and grain pests.

Securing winter crops with the necessary care during the winter and early spring period will enable farmers to increase grain production and increase the contribution of the republic's enterprises in fulfilling the Food Program.

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## MAJOR CROP PROGRESS AND WEATHER REPORTING

### WATER RESERVES, EQUIPMENT EXAMINED

Moscow SEL'SKAYA ZHIZN' in Russian 11 Mar 84 p 1

[Article by a raid brigade from SEL'SKAYA ZHIZN'--K. Nazarov, chairman of the Ordzhonikidzeabadskiy Rayon Committee of People's Control; Yu. Govorov, engineer-hydrotechnologist of the republic's agricultural ministry; I. Semykin, correspondent for the republic newspaper KOMMUNIST TADZHIKISTANA; and N. Ruzanov, reporter for SEL'SKAYA ZHIZN', Tajik SSR: "With Special Concern"]

[Text] In Tajikistan reclamation workers and farmers usually create moisture reserves in the soil long before sowing. Such is the technology of irrigated farming here. But this year water-retention irrigations are unsatisfactory with regard to pace for a number of reasons. In the enterprises of Leninabad and Kulyab oblasts they have been completed on only half of the area, and in Kurgan-Tyube Oblast this work has just begun.

Some directors try to cover up this lack of speed by complaining about the limited supply of water from inter-enterprise systems. But here is what the director of the division of water use of the republic's ministry of water resources, V. I. Snimchenko, said, "We supply as much as was requested by enterprises in water-use plans. Unfortunately, in Kanibadamskiy, Kolkhozabadskiy, Matchinskiy and other rayons a considerable quantity of water becomes waste water."

Irrigation and collection-drainage networks are being cleaned behind schedule in a number of places. Although this work was entrusted to three specialized trusts of the republic's ministry of water resources not everyone was able to skilfully take charge of the capacities of the machine-tractor fleet. Let us say that Tadzhikirremvodstroy [Expansion unknown] has 260 excavators, bulldozers and scrapers. But only 50 of them operate in double shifts.

"These are just lone facts, whereas on the whole..." the senior engineer of the trust, V. M. Valovskiy, begins to provide excuses.

But even "on the whole" he must agree that the organization of labor does not shine.

The soviet of the Ordzhonikidzeabad RAPO [Rayon agricultural production association] is alarmed by this. A decision was made to sharply accelerate

the cleaning of the irrigation and drainage network; for this a mechanized detachment had to be sent into the zone of operation of the trust Tadzhik-irremvodstroy. Where did the RAPO obtain technology? Twenty excavators were leased from industrial enterprises and building organizations, the rest were found in enterprises themselves. Things began to be more successful. We know that the same opportunities exist in other rayons as well.

From year to year there is an increase in the land area that is irrigated in the republic; there is an increase in the length of irrigators, collectors and drains. But why has the limit of contract work for repairing intra-enterprise reclamation systems within the republic's agricultural ministry decreased now by 2.2 million rubles in comparison with 1981? The problem is not money in "pure" form but in allocated materials. Incidentally, this does not decrease responsibility for the more effective use of that which exists.

Prior to the beginning of vegetative irrigation we must ready over 1,500 pumping stations and pumping units. The repair base for such technology is somewhat limited in the republic. What should enterprises do in such a situation and where can they find spare parts? Thus requests are sent everywhere for bartering. Meanwhile, the repair of pumping equipment and the production of spare parts could be organized in local enterprises of Goskom-sel'khoztekhnika [State Committee of the Agricultural Equipment Association]. In Leninabad workers were able to create a shop for the restoration of immersion pumps. Why not disseminate the experience of the aforementioned Ordzhonikidzeabad RAPO? Here the raysel'khoztekhnika [Rayon agricultural equipment association] has taken it upon itself to fully service all power pumping equipment.

We have already noted that the main water reservoirs are not yet full. The recent snowfall will correct the shortage considerably. However, there is no "extra" water and there will not be. The efficient utilization of each cubic meter is a most important task. It will be aided by improvements in irrigation methods. Very effective, especially on sagging ground, is the use of soft pipes made of materials that are impermeable to moisture, polyethylene and capron hoses and mobile means of supplying water made of aluminum. All of these have been soundly tested in Tajikistan. But meanwhile only 1 percent of the plowland is irrigated with their help in the republic. There is nowhere to obtain these handy tools for the irrigator.

It is also time to set the water-measuring equipment in order. How often has it been said that it must be installed not only in inter-enterprise but also in intra-enterprise networks, where water losses are considerable!

The days are numbered until the movement of sowing units into the fields. Now it is especially important to concentrate all efforts on the quality preparation of irrigated land. The irrigated hectare is dependable! We should add that this is true if the land is in efficient hands and if there is a caring attitude toward it.

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## MAJOR CROP PROGRESS AND WEATHER REPORTING

### BRIEFS

INTERMEDIATE CROPS SOWN--Kurgan-Tyube--The enterprises of the Vakhshskaya Valley have begun sowing perko, rape and cereal-grass mixtures. The land being used is that which was freed from late crops and cotton in interrows. In the spring intermediate crops will provide farms with highly-nutritious green mass and cotton, corn and alfalfa will be sown in the enriched soil. Before the beginning of cold weather intermediate crops will occupy 70,000 hectares in Tajikistan--much more than last year. [Text] [Moscow GUDOK in Russian 24 Sep 83 p 1] 8228

RICE CULTIVATION--Parkhar (Tajik SSR), 26 Dec 83--New rice-cultivating zones have appeared on the map of Tajikistan. Today the republic's reclamation workers have submitted a 500-hectare land area prepared by means of irrigation to the specialized Surkhob Rice Growing Sovkhoz. The land mass was assimilated in the flood plain zone of the Pyandzh River. The flooded area of virgin land extends for almost 20 kilometers along the river. It was necessary to build a dam in order to introduce it into crop rotations. On land that is enclosed from the river closed irrigation networks have been put in and complex systems of vertical and horizontal drainage have been installed. In Tajikistan the course taken has involved the development of new rice-farming enterprises in mountainous and foothill zones. Specialized sovkhozes have already been organized in Kumsangirskiy, Pendzhikentskiy, Nauskiy and Khodzhentskiy rayons. [Text] [Moscow SEL'SKAYA ZHIZN' in Russian 27 Dec 83 p 2] 8228

LEVEL FIELDS--Dushanbe--A smooth field is the basis for a large harvest. This is a fundamental principle for the farmers of Tajikistan, who have begun planning plowland in irrigated valleys. It is being done with a consideration of every plot. [Text] [Moscow TRUD in Russian 24 Jan 84 p 1] 8228

CORN SOWING--Kabodien (Kurgan-Tyube Oblast)--The farmers of the southernmost rayon in Tajikistan have begun sowing corn for grain. This is being done by large sowing units. [Text] [Moscow TRUD in Russian 17 Mar 84 p 1] 8228

EARLY CROPS SOWN--Dushanbe, 16 Mar 84--The enterprises of Tajikistan have begun the mass sowing of early vegetable, grain and feed crops. Today extensive areas in the Vakhshskaya Valley are being sown in alfalfa. This crop, which occupies an important place in field crop rotations, enables farmers to deal with two problems at once--to increase the fertility of

irrigated lands and to strengthen the feed base of livestock raising. At the same time farmers are in the process of top-dressing winter crops and of planning water-loading irrigations on land earmarked for cotton. Here special attention is given to the quality of work. Wages for most brigades and links are based directly on the final results. [N. Ruzanov] [Text] [Moscow SEL'SKAYA ZHIZN' in Russian 17 Mar 84 p 1] 8228

SNOWY WEATHER--Tursynzadevskiy Rayon, Tajik SSR--The white winter fields will also be white in the fall say the people of Central Asia. This winter, with sparse precipitation, suddenly became generous with an abundant snowfall. In the course of one day the fields of the Kolkhoz imeni Lenin of Tursunzadevskiy Rayon were covered with a fluffy white carpet of a type that has not been here for 10 years. In the south of the country frost is a rare guest of short duration. Yesterday it snowed and snowed thick flakes but today by lunchtime the weather had improved. The sun appeared. The dense snow with the appearance of being packed is becoming loose and porous. The moisture is entering the soil, where seed of the new harvest will lie. [N. Yatsenko] [Excerpts] [Moscow TRUD in Russian 26 Feb 84 p 1] 8228

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## REGIONAL DEVELOPMENT

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### DEVELOPMENT OF LAND RESOURCES, CROP YIELD IN SIBERIA, FAR EAST

Moscow EKONOMIKA SEL'SKOGO KHOZYAYSTVA in Russian No 1, Feb 84 pp 19-25

/Article by V. Boyev, academician at All-Union Academy of Agricultural Sciences imeni V.I. Lenin and director of the Siberian Scientific Research Institute of Agriculture: "Efficient Use of the Chief Means of Production"/

/Text/ The nationalization of the land and the designation of it as state property following the completion of the Great October Socialist Revolution preordained the conversion of private-ownership agricultural production, based upon exploitation and the use of primitive implements of labor, into a large-scale and highly developed branch of the socialist economy. Agriculture at the present time, with its tremendous production potential, is a central element of the country's agroindustrial complex, in which land is the chief means of production. The effective functioning of the agroindustrial complex and success in carrying out the Food Program of the USSR are precisely dependent upon the level of land usage at the kolkhozes, sovkhozes and inter-farm enterprises.

In the regions of Siberia and the Far East there are 66 million hectares of agricultural land, including 32 million hectares of arable land. This is almost one seventh of all of the country's land resources being used for agricultural purposes. Compared to the pre-revolutionary period, the areas under crops in these regions have increased by a factor of four and the cropping power for the principal food crops has increased by a factor of 2.1-3.3. The regions of Siberia and the Far East are currently producing one out of every five or six tons of grain, milk, meat or potatoes being obtained in the RSFSR.

Considerable advances in agricultural development have been achieved in Siberia and the Far East as a result of development of the virgin and long fallow lands. This year, in celebrating the 30th anniversary of the beginning of the virgin land epic, we pay tribute in the form of profound respect to those party workers, komsomols, scientists, farm leaders, specialists and machine operators -- to all who made a contribution towards carrying out this great accomplishment by our Soviet people. During the 1954-1960 period, almost 14 million hectares of long fallow land were placed into active agricultural use in Siberia and the Far East. This made it possible, within a matter of a few years and with comparatively low expenditures, to transform radically the socio-economic infrastructure of vast territories and to increase considerably the gross and marketable output of agriculture, especially grain, milk and meat.

Approximately 4,000 new sovkhozes were created on the newly developed lands and they became true factories for the production of grain and animal husbandry products. In terms of production intensity and socio-domestic working and living conditions, many virgin land sovkhozes at the present time surpass farms of the same specialization which were organized long ago and which quite often operate under more favorable soil-climatic conditions for production, transport and logistical support.

Time has confirmed to an adequate degree the high economic efficiency of the development of the virgin and long fallow lands: compared to the 1949-1953 period, the average annual procurements of grain in western Siberia during the 1954-1960 period increased by a factor of 3.2, meat and milk -- by 1.5, wool -- by 1.3 and eggs -- by a factor of 1.8. During the mentioned period, the state obtained additionally 33.3 million tons of grain, 4.2 million tons of milk, 525,000 tons of meat (in dressed weight) and 20,300 tons of wool. Considerable increases took place in the procurements of potatoes, vegetables, eggs and other products. The additional expenses for production and capital investments, used for mastering the virgin lands, were repaid with a considerable surplus. The coefficient of effectiveness for the additional capital investments amounted to 0.23. The effectiveness of the developmental work is apparent in the data furnished in the Table.

#### Economic Effectiveness of Development of Virgin and Long Fallow Lands in Western Siberia

	Total Amount for 1954-1960 Period, billions of rubles
Additional capital investments for development of virgin and long-fallow lands	1.3
Earned from the sale of additional output	3.0
Production expenditures for additional output sold	2.7
Net income of enterprises (kolkhozes and sovkhozes)	0.3
Turnover tax of grain products enterprises	5.2
National income	5.5

In those regions where large tracts of long-fallow land were at one time used for agricultural purposes, there is no specific problem for virgin land farming. There is a more general problem however -- raising the effectiveness of use of the land and other resources based upon the consistent introduction of zonal systems for the conduct of agricultural operations. These systems are oriented towards making maximum use of the achievements of scientific-technical progress and improving the socio-economic working and domestic conditions for the rural population.

The majority of the farms created on the virgin and long-fallow lands specialize in the production of grain and the products of cattle husbandry and sheep raising. Such specialization should be maintained in the future, since it responds to a greater degree to the true production conditions and to the requirements for carrying out the Food Program.

In commenting upon the successes realized in the use of the virgin and long-fallow lands, one cannot overlook the fact that full use is not being made of

the potential available in the region for intensifying the production of agricultural products: during the 8th Five-Year Plan the average grain yield in western Siberia amounted to 10.9 quintals per hectare, during the 9th -- 13.1, during the 10th -- 12.8 and in 1981-1982 -- only 9.7 quintals per hectare; in eastern Siberia, the figures were respectively 11.7, 11.8, 10 and 12.2 quintals per hectare. Moreover, during some years, owing to the weather conditions, the gross grain yields for large regions fluctuated considerably.

Thus, in the Altay Kray over the past 12 years, despite the implementation of a complex of measures aimed at raising the culture of farming, the average cropping power for the grain crops amounted to 9.9 quintals per hectare and during some years the cropping power ranged from 5.7 to 20 quintals per hectare and the volumes of state procurements (accordingly the cropping power) -- from 536,000 to 3.5 million tons; the amount of sovkhoz profit from grain sales fluctuated from 36 million to 131 million rubles. For a number of rayons, the ratios for the indicators were even greater. One can readily understand how such fluctuations can adversely affect practically all of the indicators for agricultural development, including its economic structure. At the same time, there are many rayons and farms which have relatively stable production operations.

Under modern conditions, an increase in the production of grain and other agricultural products, ensuring production stability and raising the effectiveness of expenditures can be achieved mainly on the basis of consistent intensification of production, growth in the culture of farming, the extensive introduction of land reclamation, the use of chemical processes and all-round mechanization and also improving the fertility of the land. The tremendous value of the land which, as is well known, possesses a unique property -- when efficiently utilized it raises its own productive capability -- must preclude the possibility of a disrespectful attitude towards it, especially when we bear in mind that the country's fertile land resources are limited and that the demand for farming products is constantly increasing.

An increase in the economic fertility of lands is not only the chief prerequisite for increasing the production of goods, but also for raising the effectiveness of scientific-technical progress in agriculture and in the agroindustrial complex as a whole. Thus, despite the great land resources which our country has at its disposal, the unjustified withdrawal from use of a portion of the agricultural land and even arable land cannot be tolerated. Compared to 1976, the area of agricultural lands in western Siberia decreased by 185,000 hectares, including arable land -- by 89,000 hectares. Even with minimal yields, this signifies a shortfall in output on the order of 160-200 million feed units. This is a considerable amount and particularly in view of the fact that the population increased by 650,000 during this period.

As a result of the reduction in arable land and an incorrect attitude towards the fallow fields, the sowings of grain and pulse crops decreased by hundreds of thousands of hectares. This adversely affected the overall indicators for agricultural development in the region and it lowered noticeably the effect achieved as a result of having strengthened the logistical base of the farms and improving the culture of farming. Thus it was by no means an accident that a situation developed in many regions of Siberia wherein, in the fact of higher rates for industrial development than the average for the country, a slow-down took place in the intensification of farm products production,

especially grain, and this adversely affected the development of animal husbandry and the economic indicators of the kolkhozes and sovkhozes, since the grain economy here is the most profitable branch of production in almost all of the areas.

Multiple-factor analysis reveals that an expansion in the fallow fields, in conformity with the recommendations contained in the zonal farming systems, can be achieved in many regions of Siberia by reducing the sowings of low productivity forage crops, the transformation of a portion of the arable-capable haying and pasture lands into arable land and by regulating land utilization. Over the past few years, a hectare of increase in the fallow land area, taking into account the region's conditions, ensured an increase in grain on the order of 1-1.2 quintals per hectare, with the total increase amounting to roughly 55,000-60,000 tons of grain. A reduction in the sowings of grain crops of 500,000-550,000 hectares for an expansion in the fallow land to the same degree resulted in a grain shortfall of almost 600,000 tons. It is apparent that the balance does not favor a mechanical expansion of the fallow fields.

The areas allocated for fallow fields obviously must not exceed the limits established for the crop rotation plans of the zonal farming systems. Moreover, it is important to remember a conclusion that has been verified on numerous occasions -- the high agrotechnical value of fallow land (accumulation of moisture, removal of weeds from fields) is manifested only when the fields are correctly tilled. Data obtained from scientific-research institutes and leading farms testifies to the fact that in the grain regions of Siberia, as improvements are realized in the culture of farming, a conversion should be carried out over to intensive crop rotation plans in which the proportion of grain crops must be on the order of 58-65 percent. In the process, there should be 6-9 hectares of pulse crops (at the present time, pulse crops constitute 1-2 percent) for every 100 hectares of grain crop sowings.

The interests concerned with achieving a stable increase in the production of agricultural products require the development and implementation of special-purpose long-term programs for improving use of the land, as the principal element in the system of agricultural management. Special importance is attached to the use of crop rotation plans which ensure the required production structure and to specific measures for eliminating the effects on a crop of unfavorable natural phenomena (droughts, water-logging, swamping, erosion) or the adverse properties of a soil cover (salinization, raised acidity level).

In the interest of preserving and improving the fertility of the land, objective and evaluative indicators (scales) for their quality should be available for the country's various zones. The absence of such scales makes it difficult to solve many of the problems concerned with production planning, distribution and specialization and the efficient use of the land and other production resources. This also inhibits an objective evaluation of the results of the economic activities of enterprises and agroindustrial associations.

Siberian farming, especially in the southern and central regions, suffers most of all from droughts. Multiple-factor correlation analysis of the cropping power of grain crops over the past 15 years reveals that in the Kulunda Steppe region, where grain crops occupy more than 1.5 million hectares, the harvest is

55-60 percent dependent upon the amount of precipitation that falls during the period from May to July. Over the past 100 years in the Kulunda region, 1 out of every 3 years was dry, 40 years -- semi-dry and only 27 years were favorable for obtaining good crops. But even during these years the corn obtained 70-80 percent, wheat -- 65-70 and alfalfa -- 50-52 percent of the moisture required for intensive development. Owing to a poor supply of moisture, only 25-30 percent of the natural-economic potential of the Kulunda Steppe region is being realized.

The adverse consequences of droughts are eliminated most effectively by means of irrigation. At the present time, approximately 600,000 hectares of land are under irrigation in Siberia, including 390,000 hectares of arable land. The water resources are making it possible to organize irrigation on an area of 2.5-3 million hectares. In other words, the irrigated area does not exceed 1 percent and the minimum percentage required is 4-5 percent.

An urgent problem for many forest-steppe and taiga regions is that of eliminating water erosion, draining water-logged and swamplands and eliminating soil salinization and a raised level of acidity. In all, there are more than 12 million hectares of land in Siberia in need of repair and renovation work. Practically all of the agricultural land in use is in need of applications of organic and mineral fertilizers.

The priorities for implementing measures aimed at raising the productivity of lands can be determined correctly only on the basis of evaluations of the true potential for utilizing certain resources and evaluations of the zonal and microzonal conditions for development of the APK /agroindustrial complex/, particularly the capabilities of the land reclamation organizations and the availability of fertilizers and a number of other resources. This must be reflected specifically in the overall programs for improving the use of land, as contained in the current and long-range operational plans of the kolkhozes, sovkhozes, RAPO's and agroindustrial complexes of oblasts, krays and ASSR's.

In recent years the opinion has often been expressed that under modern conditions, that is, during the period of production intensification, the available resources of fertilizers, equipment and other resources should ideally be concentrate at as few sites as possible. In this manner, agricultural complexes fully equipped with the necessary means of production will be created for the purpose of obtaining maximum yields per hectare of land utilized. In the process, the inclusion of new lands for agricultural use is viewed as an extension of the outdated extensive path of development. There is very little that is new in this approach and particularly in view of the fact that the problem is usually reviewed from an overall theoretical standpoint. In the process, it remains unclear as to which form of land utilization (intensive or extensive) plowed tracts should be considered as belonging to, after sparse forests and undergrowth have been removed from them for the purpose of sowing grain or forage crops. The expenses associated with the development of such tracts are obviously expenses for intensification, although from the standpoint of overall evaluations of new lands made available for agricultural use -- they exhibit a characteristic of extensive development. The feasibility of obtaining programmed yields is obvious, especially on irrigated lands. But it would be wrong to underestimate another source for obtaining output -- based upon the well thought out placement in operation of new lands.

It is our opinion that a reliable criterion for evaluating the feasibility of the intensification of the use of existing lands and the placement in operation of new lands is the return (in natural or cost indicators) realized from additional investments. It is especially important to take this factor into account correctly, in connection with the deficit in resources for the carrying out on an extensive scale of land reclamation work, chemical processes and other intensification measures, which obviously will be continued for more than 1 year.

The experience of farms in many regions of Siberia has confirmed the rather high return being realized from investments aimed at making new lands available for agricultural use and also for the use of fertilizers in small dosages.

In the interest of raising the efficiency of use of production resources, action must be taken based not upon unfounded opposing forms for land utilization and investment trends for developing the food complex, but rather upon an objective evaluation of specific situations, upon which the ability to obtain maximum output volumes through the use of real material and labor resources is dependent.

The experience accumulated in Tyumen Oblast serves as a fine example of the concentration of efforts aimed at intensifying the use of new lands already placed in operation. This experience has been given a high evaluation by the RSFSR Council of Ministers and it has been recommended for introduction on an extensive scale. Based upon an efficient farming system and other measures for raising the fertility of lands in Tyumen Oblast, the average annual production of grain during the 1981-1983 period, per hectare of arable land, was raised to 11 quintals compared to an average of only 5.3 quintals for western Siberia. In 1982, 31 percent of the oblast's farms obtained 20 quintals of grain per hectare and 29 farms -- 30 or more quintals per hectare.

During these same years, as a result of the carrying out of soil improvement work and the clearing out of feed lands, as well as the draining of swamps, the area of usable land increased by 115,000 hectares. This to a large degree promoted a situation wherein the average annual production of goods in the oblast during 1981-1983 increased by 13 percent above the figure for 1976-1980, including grain by 14 percent, potatoes by 18 and vegetables by 27 percent. Work directed towards achieving more efficient use of the land resources made it possible to change substantially the qualitative structure of the lands, to improve the configuration of the cultivated tracts, to regulate the road network and to increase the average size of a crop rotation field by 8-15 hectares and this promoted an improvement in the use of equipment. The average expenditures per hectare of land development -- 200-250 rubles and the reimbursement period -- 3-5 years.

Roughly 270 specialized detachments equipped with tractors, stump pullers, heavy disks and other soil cultivation equipment were created for the purpose of carrying out soil improvement work, improving the configuration of fields, pulling out individual stumps and draining swamping sectors throughout the oblast. When required, teams are created within these detachments for the removal of stumps, for gathering up wood residues, for procuring and shipping peat and for carrying out other work. The detachments and teams operate on the

basis of collective contracts, they have a permanent staff and they are not diverted by having to carry out other types of work.

In accordance with decisions handed down by the RAPO /rayon agroindustrial association/ councils, the detachments are able to use the forces and resources of aquicultural organizations, Sel'khoztekhnika and Sel'khozhimiya. Such collaboration is making it possible to carry out soil improvement work on an all-round basis and on a high technical level. The resources of planning organizations, the local and fuel industry, forestry and transport organizations are being utilized for the carrying out of this work. A mandatory element in the organization and carrying out of all soil improvement work is that of the construction of intrafarm roads, with more than 1,000 kilometers of such roads being built during 2 years of the current five-year plan at kolkhozes and sovkhozes throughout the oblast. It also bears mentioning that the logistical resources of industrial enterprises are also being utilized for the development of new lands in Tyumen Oblast; these enterprises are creating their own subsidiary rural farms and recreation bases. More than 50 such farms have been organized throughout the oblast during the past few years. They have already developed approximately 15,000 hectares of lightly forested and swampy lands, which are now being used for the production of potatoes, vegetables and forage crops.

An analysis of the materials of soil studies, intrafarm land management and planning-cartographic data reveals that in other regions of Siberia, just as in Tyumen Oblast, by no means have all of the opportunities available for making new lands available for agricultural use been exhausted. There are approximately 4 million hectares of natural haying and pasture land located on chernozem, dark-grey forest and darkchestnut soils. These lands are arable-capable in terms of their fertility and location. Owing to weak cultivation, the hay harvests obtained from them in 1970-1982 did not exceed 7-10 quintals per hectare, whereas the cropping power of grain crops on lands of similar quality amounted to 8-12 quintals per hectare, which in terms of feed units surpasses the cropping power of the hay by a factor of 3-4.

According to data obtained from SibNIIESKh /Siberian Scientific Research Institute of Agriculture/, it is possible from a practical standpoint and economically advisable to plow up roughly 12-15 percent of the pasture and haying lands. By 1984-1985, this work could be carried out on an area of 150,000-180,000 hectares, with 550,000-600,000 hectares being plowed subsequently. This could compensate for the inevitable withdrawal of a portion of the arable lands for non-agricultural use, with considerable additional output being obtained.

The principal sources for expanding the arable land include plowing up long-fallow land, clearing away undergrowth and lightly forested lands, developing felling and scorched areas, draining swamps, plowing up unnecessary roads and the territories of former populated points, partial return of tracts which were cultivated earlier and the recultivation of lands. An important factor for improving the use of land resources is the efficient organization of the territories of agricultural enterprises through the regulation of intrafarm land utilization and settlement, increased specialization and the carrying out of other organizational-economic measures.

Here is a typical example. Over the past few years at the Murashovskiy Sovkhoz in Ust'-Tarskiy Rayon in Novosibirsk Oblast, the arable fields have been expanded by 385 hectares through the plowing of unsuitable land, the clearing out of slightly forested tracts and the regulation of intrafarm land management. During this same period, the amount of arable land at the nearby Yelanskiy Sovkhoz decreased by 348 hectares and this brought about reductions in the sowings of grain crops, the gross yields of grain and in the production of milk and meat. As a result, the average annual production of grain at the Murashovskiy Sovkhoz in 1981-1983 increased by 513 tons compared to 1974-1976, milk -- by 28 and meat -- by 19 tons. At the Yelanskiy Sovkhoz, the same types of products decreased by 1096, 397 and 200 tons. At the first farm the average annual profit increased by 104,000 rubles and at the second it decreased by 431,000 rubles, although during this same period the value of the capital of an agricultural nature per 100 hectares of agricultural land increased by 3,900 rubles and at the second -- by 7,700 rubles.

Almost all of the Siberian kolkhozes and sovkhozes are able to make additional land resources available for agricultural use. The majority of the farms have technical resources at their disposal for the carrying out of such work and machine operators and specialists are available. The work is facilitated by the fact that a technology has been developed at the present time for the mastering of new lands during the winter months, at which time the machine operators and equipment are not engaged in carrying out the principal operations.

In examining the problem concerned with the use of old arable and newly developed lands, it should be borne in mind that in Siberia, especially in the northern and eastern regions where extensive industrial and transport construction work is being carried out, the work associated with making new lands available for agricultural use is viewed as being a chief condition for organizing the production of agricultural output. Naturally, the development mentioned above is no different than the intensification of land utilization.

The feasibility of making new lands available for agricultural use should be determined based upon a comparison of the expenditures required for producing the products in the vicinity of the consumption areas and for shipping them from other regions of the country. Failure to take this fact into consideration can lead to erroneous evaluations, since the expenses for shipping products to the northern and eastern regions of Siberia are indeed great. Thus the production cost for 1 ton of potatoes in Magadan Oblast is 251 rubles and vegetables -- 211 rubles. And the delivery of these products to consumers within the oblast costs another 15-18 rubles per ton.

The production cost for 1 ton of potatoes produced in western Siberia is 111 rubles and vegetables -- 65 rubles. The cost for shipping them to Magadan Oblast, taking into account minimal losses, ranges from 145 to 165 rubles per ton. Thus the total expenditures for 1 ton of potatoes brought in from the side increase to 255-270 rubles and in the case of vegetables -- to 230-250 rubles. Such ratios for the expenditures for producing and shipping products provides still another evaluation for the effectiveness and feasibility of developing new lands in Magadan Oblast and in other remote regions of the country, especially if the difficulties associated with the shipping of highly perishable products are taken into account.

Tremendous reserves for increasing the area of agricultural lands are available in the Barabinsk lowlands. Here the land reclamation fund suitable for priority development is in excess of 500,000 hectares and yet such development is being held up by a weak land reclamation base and a high degree of swappiness in the territory. One of the chief reasons for this situation lies in the fact that the problem of mastering the Barabinsk lowlands is viewed by certain departmental personnel only from the standpoint of agricultural development for Novosibirsk Oblast. Meanwhile, the conversion of the Barabinsk region into a zone of intensive feed production for the purpose of obtaining considerable quantities of meat, milk and butter is considered to be an all-state task.

During the course of examining those problems associated with the intensive use of the Barabinsk lands, consideration should be given to the prospects for developing the local supplies of petroleum and a convenient location with regard to the rapidly developing industrial regions in Tyumen and Tomsk oblasts, the Urals and in the Kuznetsk Basin and the territorial-production complexes, the formation of which is unfolding on the territory adjoining the western sector of the Baykal-Amur Trunkline.

The principal tracts of the reclaimed areas of the Barabinsk lowland should ideally be made available for use as haying and pasture lands. Computations indicate that it is possible, through the development of new lands and the carrying out of other organizational measures, to expand the sowings in the southern regions of the Barabinsk lowland by 150,000-200,000 hectares and to obtain 220,000-250,000 additional tons of forage grain annually.

One must not overlook the fact that the cultivation of the Barabinsk lands has exerted a favorable influence with regard to optimizing the structure for agriculture in neighboring regions. Thus a considerable increase in the production of beef and dairy products in regions of the Barabinsk lowlands will make it possible to increase the specialization by many kolkhozes and sovkhozes in Novosibirsk and Omsk oblasts and the Altay Kray in the production of commodity grain, mutton and wool.

In Tyumen and Tomsk oblasts, special attention should be given to the efficient utilization of the Ob'-Irtysh flood-plain, where there are approximately 3.5 million hectares of flooded haying and pasture land. The correct use of the natural feed resources of this flood-plain within Tyumen Oblast will make it possible to maintain approximately 1 million head of cattle. Over the next few years in Tomsk Oblast, with relatively low labor and resource expenditures, it will be possible to develop 560,000-600,000 hectares of feed lands and, as a result, produce up to 600 million feed units annually.

A chief condition for the efficient use of flood-plain lands is the use of a special purpose all-round approach which takes into account a totality of factors of a natural-economic and ecological nature. It must coordinate the interests concerned with the development of the productive forces, the volume and structural changes in the requirements for food products and the opportunities for utilizing grasses obtained from flood-plain lands for feeding to animals in fresh form and in the form of hay, haylage, silage, grass meal and granules. Other indicators, including the organizational forms for land utilization, must also be taken into account.

The carrying out of soil improvement work on flood-plains and swampy sectors raises the need for increasing the production and deliveries of specialized land reclamation, feed harvesting and transport equipment, for work in a technological chain in connection with achieving root and surface improvements in soil and for procuring feed. In the process, the zonal peculiarities of the land being developed must be fully taken into account.

The transport equipment and feed procurement machines being used at the present time are not very effective on swampy and water-logged soils and thus the creation and organization of the production of machines and equipment for work on water-logged lands warrant special attention by USSR Gosplan and the union ministries for agriculture, land reclamation and water management, agricultural machine building and machine building for animal husbandry and feed production. The testing of such equipment must necessarily be carried out under real conditions and in the regions of their future use.

The land resources available in eastern Siberia and the Far East, particularly in the Buryat ASSR, Chita and Amur oblasts and in Khabarovsk Kray are no less in size. The mentioned and other data testify to the fact that the eastern regions of the country have great opportunities at their disposal for increasing the production of agricultural products not only through an intensification in the use of existing agricultural lands, but also by making new tracts of land available for use. The realization of these opportunities, based upon the extensive use of the various forms of land reclamation and efficient forms for organizing and stimulating production, will be of great importance with regard to solving the Food Program for this region and also for the country's national economy as a whole.

In the interest of improving the use of lands, importance should be attached to the use of additional measures for issuing material and moral incentives to kolkhozes, sovkhozes and subsidiary farms for increasing the production of goods on lands recently made available for agricultural use. In particular, those farms which are carrying out work concerned with the placing in operation of new lands should receive priority treatment in the matter of logistical supply. For the first 5 years, it is obviously inadvisable to assign the farms firm plans for the purchasing of products obtained from newly developed lands. The use of a special purpose system for issuing bonuses to those farm leaders and specialists who participate directly in the development and implementation of measures for making new lands available for agricultural use is justified.

In view of the national economic importance being attached to making new lands available for use and the efforts being directed towards raising the fertility of all existing lands, it is believed that all operations should be planned and not spasmodic in nature. This constitutes one of the chief conditions for a stable increase in the productivity of farming and for raising the efficiency of the agroindustrial complex.

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## REGIONAL DEVELOPMENT

### IMPORTANCE OF VEGETABLES IN FOOD PROGRAM

Alma-Ata PARTIYNAYA ZHIZN' KAZAKHSTANA in Russian No 3, Mar 83 p 30

[Untitled article]

[Excerpt] In the republic's Food Program an important place is devoted to the continued increase in the production of vegetables, to expanding their assortment and to supplying them to the urban population on a year-round basis. Today the total vegetable area in the republic comprises 440 hectares, and by the end of the five-year plan it will reach 600 hectares. These riches are efficiently utilized in East Kazakhstan, Karaganda and Kokchetav oblasts. However, in a number of enterprises of Aktyubinsk and Semipalatinsk oblasts the yield from covered ground is low and enormous capital investments do not yield the necessary return.

In all oblasts the time has come to plant vegetables in open ground or to cultivate seedlings. It is the duty of vegetable farmers not to lag behind the sowing schedule. The ministry of the fruit and vegetable industry and local party and soviet organs must take measures to expand the area in carrots, beets, fennel, eggplant and peppers, for which there is an increasing demand from year to year. The availability of seed and land and the extensive experience of vegetable farmers enables us already this year to place the production of these crops on a level that will not only fulfill the plan-order as regards assortment but that will also provide a constant supply of radishes, carrots, fennel, beets and other crops throughout the summer. This question requires daily attention on the part of workers of the ministry of the fruit and vegetable industry and of village party raykoms.

A leading place in the nutrition of the population is occupied by potatoes. It is not surprising that the people refer to potatoes as the second bread. Village workers have the task of satisfying the needs of the republic in this product by means of republic supplies alone. This is the situation in Aktyubinsk and Karaganda oblasts. Special attention on the part of party organs must be given to the production and sale of early potatoes. The experience collected by leading sovkhozes and kolkhozes must become the property of all enterprises.

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## REGIONAL DEVELOPMENT

### POTATO CROP DEVELOPMENT IN KAZAKHSTAN

#### New Varieties Needed

Alma-Ata SEL'SKOYE KHOZYAYSTVO KAZAKHSTANA in Russian No 3, Aug 83 pp 14-15

[Article by Ye. Ivshin, director of the potato breeding laboratory of the Kazakh NII [Scientific Research Institute] of the Potato and Vegetable Industry, with a note from the editors following the article: "High-Yield Varieties for Potato Fields"]

[Text] The country's Food Program foresees extensive measures to improve supplies of potatoes to the population by further increasing production. Here we must emphasize that an increase in the gross potato yield must occur not by increasing the sowing area but by sharply improving productivity.

In solving this problem the role of planned variety replacement increases significantly. This is the main reserve for increasing the productivity of potatoes.

However, it is not utilized fully by far. Thus, in 1971 15 varieties of potatoes were recommended for cultivation. Ten years later only five varieties were excluded from production--Priobskiy, Penzenskiy, Skorospelka, Falenskiy and Iskra, and the same number was introduced into production--Vesna, Shortandinskiy, Belorusskiy Ranniy, Ogonek and Gatchinskiy. In recent years in the republic the cultivation of several other varieties has begun--Priyekul'skiy Ranniy, Lorkh and Murmanskiy--but because of the insignificant areas on which these are sown they have had no noticeable effect on the general improvement in productivity. All of this speaks of serious lags in renewing one of the basic means of production, which is the variety in potato farming.

At the same time it cannot be said that no work is being done in the republic on variety testing. During the last 10 years 82 varieties developed by Russian, Belorussian and Ukrainian breeders have been studied in state variety-testing plots. The low percentage of selection of suitable varieties can be explained basically by the vast difference in determining environmental factors in Kazakhstan and in the zones where the varieties are bred and from where varieties come for testing. For example, in Alma-Ata Oblast of the 19 samples studied on variety plots not a single one answered existing needs. The reasons

for rejections included low resistance of varieties to viral diseases that are widespread in a particular zone or infection of potato pulp with grey blight. Moreover, this physiological disorder, which greatly depresses the market value of a collected harvest, is evident more frequently in the more productive samples capable of yielding a high return on fertile land (examples are Berlikhingen, Iskra and Zdvizhanka).

Under such conditions it was very important to develop, on the basis of actual material, model varieties that could survive under the conditions found in Kazakhstan. In order to deal with the problem beginning in 1972 110 native and foreign varieties were studied in mountainous and foothill zones of Alma-Ata Oblast by the Laboratory of Potato Breeding in the Kazakh SSR NII of the Potato and Vegetable Industry.

The most interesting varieties for conditions in southeastern Kazakhstan are mid-season early and mid-season maturing varieties with a potential productivity of 350-450 quintals per hectare, forming ripened tubers in the period from 5-10 June to 5-10 September. The content of dry substance in these varieties is 2.5-4 percent higher than in early maturing varieties.

Because of the absence in Kazakhstan of economically-significant harvest losses resulting from phytophthora and potato cancer, special attention during the study was given to viral diseases. The resowing of varieties in the foothill zone resulted in a division of the collection into three groups.

About 10 percent demonstrated a suitability to long-term reproduction when the number of plants with external signs of viral infection did not exceed 20 percent, which allows us to implement upgrading phytopathological thinning. The selection of seed tubers from non-symptomatic plants was very effective during the following year. The productivity of the varieties Zor'ka, Al'ma, Bella, Poet and Trofi fluctuated at a level of 351-358 and was greater than that of the control variety (Stolovyy-19) by 125-132 quintals. They are characterized by a high degree of responsiveness to improved soil fertility. Among the symptoms of disease the main ones were the twirling of leaves and mottled and pleated mosaic. Considering the fact that cultivation occurred under conditions of increased infectiousness of the environment (proximity of strongly infected samples and a high density of insects, the carriers of viruses, among crops) the group that has been singled out is of great practical interest. It demonstrates the possibility of developing vital varieties with a high degree of effectiveness of seed-farming selections according to the characteristics of leaves and tubers. Varieties of this type can be successfully cultivated in Alma-Ata Oblast.

Over 60 percent of the samples had signs from year to year of striped and wrinkle mosaic within the limits of 20-40 percent of the plants per plot (Stolovyy-19, Murmanskiy, Ogonek, Mars, Grata, Anko, Berlikhingen and others). In utilizing tubers from outwardly-healthy plants for sowing the condition of crops met the needs of existing state standards for seed potatoes. However, already during the second year of resowing uniform symptoms of disease appeared clearly. According to a biochemical evaluation a decreased content of dry substance was characteristic for the varieties in this group as compared to samples from the first group.

Varieties of this type are suitable for cultivation in the oblasts of North Kazakhstan. However, their seed farming requires massive selection according to serological analysis, which makes the sowing material much more expensive.

The third group includes 22-28 percent of varieties which from year to year showed uniform symptoms of infection. In the light steppe these include twisting into spoonlike shapes and a leathery quality to the leaves of the lower and middle levels. Then after several years of reproduction the twisting of the leaves extends to the upper layer of leaves. There is a chlorotic coloration to the leaves and a lag in growth becomes noticeable. The percentage of diseased plants reaches 40-80 by the third year of resowing (varieties Sulev, Temp, Lorkh, Loshchitskiy, Ul'yanovskiy, Belorusskiy Ranniy, Gannibal, Nevskiy, Vyatka and others).

In this group there is a preponderance of highly productive, large-tuber varieties, but the build-up of infection results in rapid changes in structural elements determining the productivity of potato plants. In particular there is a significant decrease in the number of germinating buds. For example, the Lorkh variety is characterized by a large number of eyes--9 to 11, and the productive stems form from 2 to 3 of these; for the Sulev variety 1-2 stems are produced from seven eyes. For the Polesskiy Ranniy the figures are 1-2 stems per 7 eyes. A nidus with few tubers on an infected plant can be singled out as having 2-3 marketable and 6-8 non-marketable tubers. It would be practically impossible to organize seed-farming of varieties of the given type in the southeastern part of the republic.

In the foothill zone of Alma-Ata Oblast we conducted special field tests where on a background of optimally fertile soil two varieties were cultivated (resistant to viral curling of leaves and non-resistant).

Prior to planting the seed material was allowed to sprout in sawdust so that tubers with threadlike growths could be removed. Under such conditions the resistant variety withstood resowing for 7 years. The number of plants with twisted leaves did not exceed 6 percent. Total productivity with early sowing decreased during this time from 324 to 226 and the output of seed tubers dropped from 187 to 150 quintals per hectare.

The variety that was susceptible to the twirling of leaves was subject to rejection already during the third reproduction since the number of diseased plants reached 62-70 percent and the total harvest of tubers comprised 172-180 quintals per hectare with a marketability of 62 percent.

As a result of studies an experimental determination was made concerning the resistance of a particular variety to the viral twisting of leaves. This was basic to dealing with the question of the expediency of including it in the seed-farming process and its regionalization in the southeastern part of the republic.

The existing methodology for state variety testing does not permit us to determine the resistance of new samples to this disease with sufficient reliability because of the lack of continuity in reproduction. During the

first 2-3 years there is a picking-up of infections and in an environment of high soil fertility on variety plots the external signs of disease are often unclear. They are not given the necessary attention also because they are similar to the signs of insufficient water supplies and a high temperature in the soil and air.

As an example of such a situation we can look at the Penzenskaya Skorospelka and Iskra, which have been regionalized in Alma-Ata Oblast. Both varieties have a high potential productivity and are very marketable. However, already at the stage of primary seed-farming they demonstrated non-resistance to the twisted-leaf virus. The number of diseased plants reached 28-32 percent 4 years after including elite potatoes into the yield scheme; and for crops of the first reproduction--40-45 percent. After some unsuccessful attempts to organize the seed-farming of varieties they were taken off the list of varieties regionalized for the oblast. A similar reaction to zonal conditions was demonstrated by the varieties Garchinskiy, Ogonek, Belorusskiy Ranniy, Priobskiy and Zaural'skiy.

Similar mistakes can be avoided in the evaluation of the vitality of varieties under conditions in Kazakhstan, especially in the southeastern part of the republic, by introducing preliminary testing of these varieties in an infectious environment. The conditions necessary for this can be created in the foothill region of Alma-Ata Oblast if the varieties being tested are planted alternately with plots of infector-varieties (local reproduction of the Lorkh variety). The plots are double-rowed and the repetition factor is 3. There are 60 plants per plot. During the vegetative period there are no phytopathological thinnings. Two tubers per plant on one or another plot are selected for sowing during the following year.

Those varieties which will have no more than 20 percent diseased plants during the second year of sowing and which will not become infected with grey blight can be included in extensive testing in the republic.

The special features determined for combining useful characteristics in varieties appropriate for Kazakhstan were included in a program of breeding work by the KazNIIKOKh [Kazakh scientific research institute of the potato and vegetable industries]. In 1976-1982 positive results were achieved. A group of mid-early and middle-maturing hybrids with an increased resistance to serious viral diseases was selected.

For example, the average productivity of hybrid 1189-70 comprised 301 quintals per hectare in Alma-Ata Oblast, 318 in Karaganda Oblast and 371 in Kustanay Oblast with 6-9 percent of the crops diseased. Similar features are characteristic for hybrids 1503-71, 50-c73-780 and 1485-71. This year it is planned to submit hybrid 1189-70 for state testing.

The existing results convincingly show the expediency of the accelerated development of Kazakh potato breeding and of the creation of support points in all of the natural zones of the republic.

[From the Editors] The questions raised in the article by Ye. Ivshin are especially urgent today when we are dealing with the most important task of intensifying agricultural production and of fulfilling the Food Program.

In Kazakhstan potato production still lags behind demand. One of the main reasons for this is insufficient attention to the problem of variety renewal.

The practice of selecting potato varieties for inclusion in variety testing as well as the methodology for conducting these tests itself require improvements, and here the work is up to the republic's agricultural ministry.

Sovkhozes and kolkhozes are awaiting further scientific elaborations and the rapid introduction of these elaborations into practice from the Kazakh Scientific-Research Institute of the Potato and Vegetable Industries and from the Eastern division of VASKhNIL [All-Union Academy of Agricultural Sciences imeni V. I. Lenin].

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#### Follow-Up Commentary

Alma-Ata SEL'SKOYE KHOZYAYSTVO KAZAKHSTANA in Russian No 12, Dec 83 p 17

[Article by N. Plotnikov, director of the inspectorate of the State Committee on Variety Testing of Agricultural Crops of the USSR Agricultural Ministry in the Kazakh SSR: "High-Yield Varieties for Potato Fields"]

[Text] An article entitled, "High-Yield Varieties for Potato Fields," published in the journal SEL'SKOYE KHOZYAYSTVO KAZAKHSTANA (No 8, 1983) touched on urgent problems related to potato production in Kazakhstan. At the present time there are 14 varieties of this crop regionalized in the republic; of these six were regionalized during the last 10 years. However, because of the lack of organization in seed-farming and of a shortage of sowing material new varieties are being introduced into production slowly. For this reason many enterprises often conduct sowing using non-regionalized varieties. Thus, each year in the republic's sovkhozes and kolkhozes about 50 percent of the area is occupied by non-regionalized varieties and 41 percent are completely non-quality crops. All of this results in extremely low harvests and high production costs. It should be noted especially that production is in need of highly productive varieties of potatoes noted for their high content of dry substances, for their overall resistance to the main diseases and for their suitability for mechanized cultivation and harvesting.

The shortage of middle-maturation varieties is more sharply felt under conditions in the south and southeast of the republic, where potatoes are subject to deterioration. According to Gossortset' [State variety network], one of the main reasons for this is the absence of varieties developed in Kazakhstan.

The article raises an important question about the necessity of improving the methodology for testing new varieties and schedules for testing. It is

true that the work being done today does not permit us to determine the resistance of new potato samples to viral diseases. For this reason, in accordance with the resolution of the plenums of the State Committee on Variety Testing of Agricultural Crops in the USSR Ministry of Agriculture for 1982-1983 it is planned to alter the order and methodology of potato variety testing. The directors of the republic's variety plots have been told to make their proposals on this question and after they are generalized they will be sent to the union state committee.

As for preliminary testing of potato varieties for viral diseases, we feel that this work should be done by scientific-research institutes where the conditions and necessary equipment for this do exist; Gossortoset' should then be presented with new varieties which already have an increased resistance to many diseases, including to viral diseases.

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## REGIONAL DEVELOPMENT

### WAYS OF COMBATING SLUGS DISCUSSED

Moscow ZASHCHITA RASTENIY in Russian No 2, Feb 84 p 45

[Article by V. G. Linskiy, senior scientific worker of KazNIIZR [Kazakhstan scientific research institute of plant protection]: "Combatting Slugs"]

[Text] In recent years in southeastern Kazakhstan the number of slugs has increased sharply and they have begun to do considerable damage to vegetable and berry crops, especially in individual and private orchards and gardens.

Slugs are polyphagous pests, but they are particularly skilful at eating tomatoes, cucumbers, cabbage, carrots and strawberries. The damage done to plants is compounded by the fact that mollusks are the carriers of fungal diseases. Slugs feed at dusk and during the night, and during the day when the weather is grey and rainy. On sunny days they hide in the cracks of the soil and under clumps of dirt, the remains of plants or under other things which do not allow light to penetrate and where the soil remains very moist. In moving the mollusk leaves a shiny trail by which one can determine the presence of the pest in an area as well as the location of a concentration of slugs.

Slugs reproduce via eggs. Females oviposition them in groups of 10-35, usually in the cracks of the soil at a depth of 5-10 centimeters or under clumps of dirt. The fertility of a single female equals up to 400 eggs.

In order to combat this pest it is recommended that mineral fertilizer or calcium hydroxide be placed in interrows, and of insecticides--metal'degid. Spraying with it or distributing its granules should be completed no later than 20 days prior to harvesting.

We propose that slugs be dealt with in covered areas where they concentrate. To encourage the concentration of mollusks on specific areas these areas should not be irrigated for 5-7 days, until the soil becomes dry. After this boards, sackcloth, plywood, heavy paper, cardboard, cabbage leaves, sunflower calathides, watermelon cores and so forth are placed at particular locations, and the soil under them is abundantly moistened. The next day the coverings are taken away and the congregated mollusks are sprinkled with nitrogen, phosphorus or potassium mineral fertilizers. As soon as the mollusks throw off the slugs (1-2 minutes) the sprinkling is repeated. After the

elimination of the pests the coverings are taken to another location, and so on. The entire procedure is repeated in the course of 2-3 days. The recommended method enables us to decrease the number and harmfulness of slugs.

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## REGIONAL DEVELOPMENT

### BRIEFS

IMPORTANCE OF POTATOES, VEGETABLES--Party, soviet and economic organs must strengthen their attention to the production of potatoes and fruits and vegetables, primarily in the foothill regions, in order to fully satisfy demand without importing them from outside. Although last year, as compared with the previous year, gross yield increased, demand is not satisfied by far. We must complete the development of specialized zones for the production of potatoes on an industrial base, as is done in Kustanay, Karaganda and Aktyubinsk oblasts. It is important to expand the area for cultivating early potatoes in the southern oblasts of the republic. More vegetables should be produced directly in zones where they are consumed and the assortment should be expanded. Last year again the plan for the procurement of sugar beets was not fulfilled. We must work out and implement additional measures to increase productivity and the sugar content of sweet roots, increase the productivity of plantations of oil-bearing crops, improve the agrotechnology of their cultivation and improve the technology for collecting and storing the harvest. [Excerpt] [Alma-Ata SEL'SKOYE KHOZYAYSTVO KAZAKHSTANA in Russian No 1, Jan 84 p 2] [COPYRIGHT: "Sel'skoye khozyaystvo Kazakhstana"--"Kazakhstan auyl sharuashylyghy", 1983/84.] 8228

MOUNTAIN POTATO FIELDS--Alma-Ata--Another base for the production of potatoes--a mountainous one--has been created in Alma-Ata Oblast. It consists of 5,000 hectares of plowed virgin lands on which there are irrigation systems from six specialized sovkhozes and kolkhozes of Narynkol'skiy and Kegenskiy rayons. Storage facilities for tubers have been built. Farmers have begun planting this food crop. Seed of productive regionalized varieties--Berlikhingen, Iskra and Ogonek--are being sown in fertilized soil. The climate of Zailiyskiy Alatau allows us to produce large potato harvests--150-200 quintals per hectare. The development of the new base will allow us to provide the population of the oblast with natively-produced tubers on a year-round basis. Plantings are divided according to time of maturity. Already in June production will enter the trade network from the Chingel'dinskiy Oasis to the semi-deserts of the Southern Transbalkhash'ye; in July and August--from foothill enterprises; and in the fall and winter--from the mountain enterprises. [Text] [Moscow GUDOK in Russian 12 Apr 83 p 1] 8228

APPLE ORCHARD PREPARATIONS--Chimkent--Snow is still on the ground but in the orchards of Southern Kazakhstan spring work has already begun. It is different than usual--the orchard farmers of the Sovkhoz imeni Michurin are constructing ferroconcrete structures in future orchards; these are necessary for palmetto apple trees. [Text] [Moscow TRUD in Russian 28 Feb 84 p 1] 8228

LARGER BARGES--Alma-Ata--The shipment of loads to the rural regions of the Northern Tyan'-Shan' along the Ili River on large-capacity barges has begun. The building of vessels with a larger capacity for this mountain river was assimilated in Kapchagay. Today in connection with expanded sowing areas the stress placed on this transportation artery is increasing sharply. The use of new, 800-ton vessels whose capacity is four times greater than that of previous vessels enables us to ship tens of thousands of tons more than last year. Because of this trucks belonging to sovkhozes and kolkhozes have been completely rerouted from long-distance trecks to helping out with sowing operations. [Text] [Moscow SEL'SKAYA ZHIZN' in Russian 22 Mar 84 p 1] 8228

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AGRO-ECONOMICS AND ORGANIZATION

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ROLE OF PRICING IN STRENGTHENING ECONOMY OF APK

Moscow EKONOMIKA SEL'SKOGO KHOZYAYSTVA in Russian No 2, Feb 84 pp 26-32

[Article by V. Kufakov, department chairman of USSR Goskomtsen [State Committee on Prices]: "Improving Pricing in the APK [Agro-Industrial Complex]" ]

[Text] In 1983 agricultural enterprises were working under new conditions. The CPSU and the Soviet government have created a stable economic basis for work on the principles of cost accounting. The goods produced were sold to the state at increased prices. The stimulation of kolkhoz-sovkhoz production yielded positive results everywhere. There was an increase in the production and procurement of agricultural products, there has been a noticeable strengthening of the economies of enterprises, interrelations between branches of the APK are improving, and technological and labor discipline are increasing. In answer to the decisions of the June and December 1983 plenums of the CPSU Central Committee socialist competition has been initiated in all APK enterprises between enterprises and their subdivisions for the fulfillment of the Food Program ahead of time and for improving indicators for each labor collective.

The Food Program, approved by the May 1982 Plenum of the CPSU Central Committee embodies a whole, comprehensive approach to the solution of the food problem. Its most important integral factor is the development locally of a single system for managing agro-industrial production, the improvement of economic interrelations between agriculture and other branches of the national economy, and the introduction into agricultural production of cost accounting management principles.

Each problem, taken individually on the basis of the aforementioned integral factors, is a large-scale direction toward the overall improvement of the country's agriculture in terms of its nature and its new approach toward solving existing problems. The main connecting link between the problems is the strengthening of economic methods of management in all spheres of agricultural production, orienting all production collectives toward achieving high final results. Cost accounting and its elements--an optimal plan, coordination of production expenditures with production results, replacing expenditures with income, costs, pricing, profits, profitability, increasing the material interest of workers in decreasing expenditures and in increasing

the volume of production output of good quality items and the economic use of resources--are the main factors in improving agricultural production and other branches of the agro-industrial complexes not only in enterprises but in subdivisions as well.

Here a special role is attributed to pricing. As we know, under the conditions of capitalism or a simple commodity economy prices fluctuate around costs depending upon supply and demand. They are formed spontaneously, but in the final analysis with an observation of the laws of cost, considering the expenditure of necessary public labor for the production of a unit of product sold. Under the conditions of socialism the demands of the cost laws within a system in which other economic laws are operating are considered in the central planning of prices. With the aim of the price mechanism stable and balanced economic management conditions are created to a considerable degree and there is an achievement of equivalency in exchanges between kolkhozes, sovkhozes and enterprises servicing them and of parity between agricultural production and the means of production delivered to the village.

However, during the last 10-15 years the cost of obtaining oil, ores and other mineral raw materials as well as of producing electrical energy has increased in the entire world, including in the USSR. In turn, this resulted in increased prices for oil and technology, which today are constant elements in agricultural production. The intensive transition of kolkhoz-sovkhоз production to an industrial base resulted in increasing the delivery of industrial products to the village. The relationship between prices developed unfavorably for agriculture. The imperfect technical reequipping of agriculture also had an effect, and enterprises found it necessary to employ a great deal of manual labor. There have also been instances of inefficient and sometimes of uneconomical use of technology. Expenditures for preserving land resources and for protecting the environment are increasing.

Another important circumstance was the fact that wages for agricultural workers lagged sharply behind those for workers in the industrial branches of production. The measures that were taken to bring the wage level of agricultural workers in line with that of urban workers resulted in a rapid rise in the wages of kolkhoz farmers and sovkhоз workers as compared to the rise in labor productivity. The unfavorable weather conditions of recent years have had a negative effect on the economies of kolkhozes and sovkhozes in recent years.

The sum total of the aforementioned and analogous factors resulted in a significant growth in expenditures, an increase in the cost of production output and a decrease in profitability. Whereas during the Eighth Five-Year Plan for each 100 rubles of gross agricultural production (in comparative 1973 prices) expenditures comprised 70 rubles, during the ninth the figure was 89 and during the 10th it increased to 111 rubles; as a result some agricultural enterprises did not have their own resources to expand production because of low profits or a total lack of profits.

Under these conditions increasing procurement prices and establishing supplements to them became an extremely important economic and socio-political

measure. This is why the May 1982 Plenum of the CPSU Central Committee dealt with the question of allocating 16 billion rubles annually for raising procurement prices and establishing supplements to them. This almost equals the amount that procurement prices have been raised during the last 17 (since 1965) years. This has enabled us to create new circumstances in the village, characterized by the fact that normally-functioning collectives are reimbursed for expenditures for products sold as well as being provided with profits in a size necessary to develop funds for economic stimulation and expansion of production. Now the main source of vitality and activity for collectives are the resources earned by them, the size of which depend primarily on the results of labor.

In fulfilling the decisions of the May Plenum of the CPSU Central Committee and in reexamining procurement prices there was a change in the accepted order of compensating agriculture for additional expenditures in relation to the increase as of 1 January 1982 of wholesale prices for industrial production and the previously increased prices for gasoline. This enabled us to add another 5 billion rubles annually. Consequently, the total sum being directed at raising procurement prices and establishing supplements to them reached 21 billion rubles.

Calculations as well as the results of work for 1983 show that the allocation of such a sum will enable us to secure a more profitable management of production in all union republics. Now we have provided a stable economic base for the universal introduction of cost accounting in all links of kolkhoz-sovkhoz production. This cannot, however, be achieved only by means of increased procurement prices, since considerable differences remain in natural and economic conditions and in the level of development of an enterprise.

The fact is that economically-strong enterprises are first to benefit from the raising of procurement prices. With the aid of the state they create a powerful agro-industrial base which secures a high level of mechanization and some automation of agricultural production. For example, the fattening of hogs and cattle, the development of poultry-raising, vegetable farming on closed ground and other branches usually are carried out in such enterprises on an industrial basis, with lower expenditures of labor and resources and at a high level of profit.

A significant portion of kolkhozes and sovkhozes has not been able to reach a high level of production intensity because of limited capacities of building organizations, limited material-technical and financial resources and unfavorable natural-weather conditions. In these enterprises the productivity of agricultural crops, livestock and fowl is still low. But they have large reserves and possibilities for increasing agricultural production output.

In economically-weak kolkhozes the state has taken upon itself the financing of expenditures for a total sum of 3.3 billion rubles. These resources are being allocated for the building of roads, schools, hospitals, children's preschool facilities and objects used for cultural and domestic purposes. The repayment of debts totalling 11 billion rubles by lagging enterprises has

been delayed to a later time. For sovkhozes and kolkhozes operating at a low or no profit margin supplements to procurement prices for products sold to the state totalling 9.8 billion rubles annually have been instituted. In doing this more equal opportunities are created for enterprises operating in different natural-economic conditions so that there can be a strengthening of cost accounting principles, an expansion of agricultural production and improved cultural-domestic conditions.

The sum total of supplements distributed among union republics is in accordance with the volume of agricultural products sold by enterprises operating at a loss or with low profits. The councils of ministers of union republics distributed the sums received among oblasts, krays and autonomous republics. The latter, as represented by rayon and oblast agro-industrial associations and pricing organs, confirmed the lists of enterprises receiving supplements as well as the list of products for which supplements are paid, and the size of the supplements in percent of procurement price (no higher than 75 percent). Supplementary payments are made to procurement organizations during the payment of accounts.

This order for distributing resources allows us to determine supplements to procurement prices with more justification and with a consideration of local conditions to those enterprises which are characterized by objectively worse economic and soil-climatic conditions, with the goal of raising the profit level in these enterprises to 12-15 percent.

Supplements to procurement prices for agricultural products sold to the state by kolkhozes, sovkhozes and other agricultural enterprises operating at a low profit or at a loss were established in 1983-1985. Our goal is to secure their effective utilization in the interest of improving the enterprise's economy.

The largest part of the resources allocated to raise procurement prices and to establish supplements to them (16 billion of 21 billion rubles) is being directed at stimulating production output in livestock raising. Procurement prices have been raised for milk, cattle, hogs, sheep and goats, poultry, horses and camels, wool, leather and fur raw materials. Under the conditions of new prices and supplements all branches of livestock raising in all union republics are becoming profitable. The distribution of the sum total of resources for raising procurement prices for livestock products and supplements to them are presented in the table.

In addition, there is an average of a 10 percent supplement to procurement prices for grain crops, especially grain-forage crops: corn, barley and oats. There has been a significant increase in procurement prices for groats crops--millet and buckwheat--with the goal of maximally stimulating production and in the coming years of fully satisfying the need for these crops, as established in the Food Program. Procurement prices have been increased for sugar beets, sunflowers, cotton raw materials, flax and hemp products, tobacco, hops, essential-oil crops and potatoes. There was an allocation of 0.4 billion rubles for raising procurement prices for vegetables, fruits and grapes under the jurisdiction of the councils of ministers of union republics. This was done to stimulate locally the production of the necessary types of

Table

	Increase in prices	Supplements	Total	Profit level, % (1983)
Milk	2,882	3,682	6,564	20
Cattle	2,342	3,219	5,561	19
Hogs	790	1,086	1,876	24
Sheep and goats	233	230	463	25
Wool	362	413	775	14
Poultry	284	28	312	8
Leather and fur raw materials	427	12	439	--
Horses, other livestock	59	--	59	--
Total	7,379	8,670	16,049	--

vegetables, fruits with pits, table varieties of grapes and dried fruits. Using the totals released the councils of ministers of union republics raised the prices for table grapes from 29 to 75 percent, of fruit with pits--from 26 to 58 percent and of dried fruits--by a factor of 1.5.

As a result of the increase in procurement prices and the establishment of supplements for enterprises operating with low profits or at a loss, the average profitability from the sale of agricultural products in kolkhozes and sovkhozes will reach 22 percent as compared with 7 percent in 1981.

Of the total 21 billion rubles, 11.2 billion were channeled directly into raising procurement prices. This enabled us not only to improve conditions for the cost accounting activities of kolkhozes and sovkhozes but also to implement improvements in procurement prices in union republics and neighboring regions with a consideration of the quality of production and the schedule of procurement. It should be noted that in recent years union republics have been allocated resources for increasing procurement prices several times. In some places in economically-similar conditions prices for the same types of products varied considerably. This resulted in some undesirable consequences in neighboring regions. With the establishment of the new prices these shortcomings were eliminated.

Practically the same procurement prices have been established for the main products of agriculture and livestock raising as of 1 January 1983 in the Baltic States, Belorussia and the republics of the Transcaucasus; for sheep, hogs, milk and farming products--in the republics of Central Asia. In connection with the significant increase in prices and the introduction of supplements to them, in a number of republics there has been a decreased need for zonal differentiation of prices.

The improvement in pricing in accordance with the decisions of the May 1982 Plenum of the CPSU Central Committee has enabled us to decrease the number of price zones in the RSFSR for milk from 176 to 78; for cattle--from 40 to 30;

for sheep--from 33 to 15; for grains--from 73 to 53; for sugar beets--from 9 to 6; and for potatoes--from 6 to 5 zones. The number of oblasts, krays and autonomous republics in the RSFSR that implemented intra-oblast differentiation of procurement prices decreased from 52 to 28. In the Kazakh SSR prices for cattle were determined for three zones instead of the previous seven; in the Ukrainian SSR--in two instead of three. The Lithuanian SSR Council of Ministers has turned away from zonal price differentiation. In this republic previously procurement prices were differentiated according to four groups of enterprises. In Azerbaijan it was not considered necessary to differentiate prices for cattle and sheep according to zones, whereas previously three zones existed.

A big new step was taken in stimulating production quality by means of procurement prices. For example, beginning with the harvest of 1981 the enterprises of the Azerbaijan SSR and the Tajik SSR made the transition to single prices according to quality for cotton raw materials, with a significant increase in prices for the first to third quality categories. Practice has shown the high degree of effectiveness of the measures taken. In these union republics the proportion of first and second class varieties equalled 75 percent and was the greatest in the country. Proceeds per 1 ton of cotton raw material in the Azerbaijan SSR increased to 812 rubles in 1981 as compared with 694 in 1980; in the Tajik SSR--from 709 to 726 rubles. Profitability increased from 39 to 50 percent and from 24 to 37 percent respectively.

The increase in procurement prices created the conditions for universally interesting enterprises in the transition to prices for cotton raw materials based on quality. As a result, since the 1983 harvest the entire country has been unified under a single system for receiving and paying for cotton raw materials, which creates material interest in enterprises to provide the state with high-quality raw materials.

Experience over a period of many years teaches that flax products sold early were of a higher quality than those sold later. This is why supplementary payments have been established for flax products sold at the optimum time.

New procurement prices for potatoes are differentiated according to the time of purchase. This will strengthen the interest of enterprises in storing products locally and in shipping potatoes of a higher quality to trade enterprises at a time that is less intensive for transportation resources.

Union republics have instituted a significant strengthening of differentiation in procurement prices to stimulate quality. Higher procurement prices for first class milk have been established in the Belorussian SSR. In the Kirghiz SSR and the Turkmen SSR prices for lean livestock and non-standard sheep were set 46-70 percent lower than livestock of average weight. As a result of this prices for standard livestock were increased. Similar work was done to stimulate high-quality production in other union republics as well. It should be noted that even with the new prices supplements do remain--50 percent of procurement prices paid out during the sale by kolkhozes and sovkhozes to the state of the basic types of products above the sales levels achieved during the 10th Five-Year Plan. As before, the enterprises and organizations realizing the procurement of agricultural products bear all the expenses involving transportation, forwarding and unloading.

More favorable conditions have been created for the procurement and sale of non-standard fruit-vegetable and other perishable products that can be used in fresh or processed form. This has also been extended to standard perishable products submitted by kolkhozes and sovkhozes above the volume foreseen in contractual agreements. It is allowed to procure these products according to the conditions and prices established in agreements between parties.

In order to more fully utilize the resources of fruit and vegetable production, kolkhozes and sovkhozes have been permitted to sell up to 10 percent of the planned procurement volume as well as above-plan production to organizations of consumers' cooperatives and at kolkhoz markets. These products are sold according to prices determined by the contracting parties. In doing this, this production is included in the fulfillment of the state procurement plan. As of 1 January 1983 the procurement of rabbits from enterprises and individuals is assigned to procurement organizations of consumers' cooperatives. These products are procured according to prices according to agreements and are counted toward the fulfillment of the state plan for meat procurement.

The establishment of new prices with a consideration of the production conditions of every enterprise and the development for them of great opportunities to expand production have opened up vast horizons for exhibiting creative initiative and socialist demandingness on the part of all enterprise directors and village workers with the goal of improving production and increasingly meeting the needs of our country's population for food and our industry for raw materials. "The workers of the agro-industrial complex must daily increase their efforts," said Comrade Yu. V. Andropov, the General Secretary of the CPSU Central Committee, at the November 1982 Plenum of the CPSU Central Committee, "and work in such a manner so as to insure that the great resources being directed at solving this problem yield a return already today and an even greater return tomorrow."

The successful completion of the Food Program requires a proportioned and balanced growth of agriculture, of the branches of industry servicing it, of the food industry, and of all the other branches that together form the agro-industrial complex of the country. A comprehensive approach to solving the food problem involves combining and unifying the work of agriculture itself as well as of the branches of industry servicing it, transportation and trade and then subordinating all of their activities to a common final goal--the production of high-quality food products and the bringing of these products to the consumer.

The Food Program foresees the consistent growth in the volume of delivery to agriculture of technology, machines and equipment, fertilizers and chemicals to protect plants, and mixed fodder of high quality. There has been a considerable expansion of the building of production objects, housing, cultural facilities and rural roads. During the decade fixed agricultural production funds will increase by a factor of about 1.5, energy capacities--by a factor of 1.7, and fertilizer supplies--by a factor of 1.7.

The role of prices for the means of production and for services continues to increase according to the degree of intensification of agriculture and to its

transition to an industrial base. Here industry must constantly renew products that are being manufactured depending on the level of scientific-technical progress achieved and then improve their quality. This circumstance results in the necessity to reexamine wholesale prices, to improve the consideration in pricing of expenditures for manufacturing goods, to differentiate prices according to the quality level of products, and to stimulate the most effective machines and types of equipment with pricing and supplements. In turn, this has a great effect on raising the cost of a unit of production in agriculture and consequently on the economy of the kolkhoz or sovkhoz.

In our country a system of measures is being implemented that is directed at repressing the negative effects on the agricultural economy of factors related to raising wholesale prices and tariffs. In selling tractors, combines, agricultural machinery and mineral fertilizer to kolkhozes and sovkhozes the price levels existing prior to the reforms of wholesale prices in 1967 have been retained during the entire period. The difference between wholesale prices for industry and wholesale prices for agriculture with regard to technology and mineral fertilizer is reimbursed by the enterprises and organizations of USSR Goskomsel'khoztekhnika [State Committee of the Agricultural Equipment Association] from the state budget. In 1983 subsidies from the state budget for technology and mineral fertilizer will equal 4.3 billion rubles. Electrical energy for agriculture is made available according to preferential rates--1 kopeck per kilowatt hour instead of 3 kopecks for industrial enterprises. Moreover, kolkhozes and sovkhozes are provided heat electrical energy and supply-line gas for the hothouse-hotbed industry according to preferential rates as well.

The strictest controls are implemented in determining prices for the industrial means of production too. Prices for agricultural technology and other material resources are established by USSR Goskomtsen [State Committee on Prices] with the participation of the USSR Ministry of Agriculture and USSR Goskomsel'khoztekhnika. Here as a rule prices are determined with a consideration of the level of existing prices for previously-assimilated analogous products and of increasing the productivity of new technology, as well as of improving its other technical and economic indicators.

The resolution of the CPSU Central Committee and the USSR Council of Ministers, "On Improving the Economic Relations of Agriculture and Other Branches of the National Economy," has posed with new strength the question of controlling the relationship between procurement prices for agricultural products and wholesale prices for industrial goods supplied to agriculture as well as production services provided to agriculture. In this document the USSR TsSU [Central Statistical Administration] and the USSR Goskomtsen are assigned, beginning in 1983, the job of calculating indices for changes in wholesale prices for industrial products supplied to agriculture, procurement prices for agricultural products and fixed rates and tariffs for services rendered to kolkhozes, sovkhozes and other agricultural enterprises. As in other branches of the national economy, for the first time this will be foreseen: in determining the level of procurement prices for the next five-year plan there will be a consideration of the necessary determination of a branch norm for the aggregate profitability of agricultural production considering

the planned volume of production and procurement of agricultural products, the supply of resources in enterprises, the level of wage payments and other planned expenditures for the production of agricultural products. It is planned to increase the effectiveness of agricultural production, to improve the utilization of fixed assets and floating capital and to decrease material expenditures.

The grandiose tasks established by the USSR Food Program have attracted the attention of all agricultural workers. In particular, the article by A. Spiridonov, "Improving the Organization of Pedigree Livestock Raising," published in 1982 in Number 12 of the journal EKONOMIKA SEL'SKOGO KHOZYAYSTVA, provides some valuable advice. The author proposed annual exhibitions-fairs for the calves of highly productive cows and their sale at auction. In addition, he writes, "The time has come to efficiently establish new prices together with quotas for the sale of products during the coming five-year plan," for every enterprise.

The aforementioned resolution states that the USSR State Committee on Prices, in agreement with USSR Gosplan and interested ministries as well as with the councils of ministers of union republics, "...based on changes in the relationship between existing procurement prices for agricultural products and wholesale prices for industrial production sold to agriculture...introduces proposals on procurement prices for agricultural prices and supplements to them at the same time as it presents a draft of the plan of economic and social development of the USSR during the next five-year plan to the USSR Council of Ministers." In our opinion, the basis for these proposals must be a thorough scientific-economic analysis primarily of the RAPO [Rayon agricultural production association] in every enterprise, as A. A. Spiridonov proposes in the aforementioned article.

The aforementioned resolution shows the ways to improve economic interrelations among all branches of the agro-industrial complex. The main criteria for the work of enterprises and organizations of USSR Goskomsel'khoztekhnika, Soyuzsel'khozhimiya [All-union agricultural chemical association] and the USSR Minvodkhoz [Ministry of Water Resources] as well as for the development of funds for material incentives were determined to be the following in the resolution: growth in agricultural production output and increased labor productivity in serviced enterprises, the fulfillment of contractual obligations, and a decrease in the cost of work and services. The basic indicator for the activities of procurement enterprises and organizations is the fulfillment of the state plan for the procurement of agricultural products and raw materials, a growth in the volume of procurement, securing the preservation of procured products, the timely processing and delivery of products to consumers in a wide assortment and with good quality, and a decrease in expenditures for procurement.

In order to more successfully implement the Food Program new administrative organs, especially RAPO, have been given the right of pricing. Rayon agro-industrial associations confirm, on the basis of model positions, rates (tariffs) for services rendered and for work done by enterprises and organizations within the association regardless of departmental membership. They

establish accounting prices for livestock, feed, material and other resources supplied to kolkhozes and sovkhozes by each other. RAPO's are preparing proposals on establishing supplements to procurement prices for products sold by enterprises operating at a low profit or at a loss.

Organizational and economic measures in branches of the agro-industrial complex implemented by the new administrative organs, and increased procurement prices have a considerable effect on the realization of the Food Program. In addition to the increase in economic interest there is a growth in the responsibility of all links of the agro-industrial complex for increasing production output and for improving the quality of production.

Last year in the USSR there was an increase in the procurement of grain, potatoes, sugar beets, milk, livestock, poultry and other products of farming and livestock raising. Significantly more coarse and succulent feed for the public herd has been procured for the coming winter period. The financial condition and economic indicators of kolkhoz and sovkhoz operations have improved. There has been an increase in profits from the sale of products. For many types of production output costs have decreased. According to preliminary data the enterprises of the RSFSR, for example, finished 1983 with profits of 8 billion rubles. Profitability from the production of farming products sold to the state reached 30 percent in sovkhozes and 43 percent in kolkhozes; of livestock raising products--23 and 6 percent respectively. The total profitability of production in the enterprises of the RSFSR in 1983 comprised over 16 percent.

The kolkhozes and sovkhozes of Moscow Oblast have achieved high production indicators by skilfully utilizing new economic opportunities. In 1983 the oblast received 1.5 times more potatoes per hectare as compared to levels for the preceding year, the productivity of vegetables increased to 408 quintals per hectare, and the productivity of cows increased by 223 kilograms, reaching 3,200 kilograms. There was a drop in the cost of producing potatoes, milk and beef per unit of production. The state was sold 1,637,000 tons of vegetables and potatoes, which is 469,000 tons more than during the preceding year. The volume of milk sales to the state increased to 1,610,000 tons. More milk, vegetables and potatoes, livestock, poultry, eggs and other agricultural products were sold. As a result the profits of enterprises surpassed 400 million rubles.

There was a significant improvement in the work of the Yamskoy Sovkhoz, Domodedovskiy Rayon, Moscow Oblast, which previously operated at a low profit, or sometimes even at a loss. Here there is a consistent implementation of a plan to eliminate economic losses, to increase the productivity of agricultural crops and of livestock, to strengthen the material-technical base of the sovkhoz and to improve the organization of labor and production. As a result in 1983 as compared to 1982 the productivity of potatoes in the sovkhoz grew from 101 to 163 quintals per hectare; of root crops--from 390 to 412; and of green mass of feed crops--from 276 to 284 quintals per hectare. Milk yield per cow increased by 200 kilograms and the average daily weight gain of cattle increased. This enabled the enterprise to increase profits by 1,200,000 rubles, of which 320,000 rubles were obtained by means of supplements to procurement prices. Total productivity for production output reached 14 percent instead of the 2 percent loss experienced in 1982.

In 1983 under difficult weather conditions good economic indicators were achieved by the kolkhozes and sovkhozes of the Chuvash ASSR. Gross agricultural production in the republic increased by 11 percent. Forty three percent more meat than in 1982 was sold to the state; 29 percent more milk. The profits of enterprises from the sale of agricultural products increased from 8.7 million rubles in 1982 to 133 million rubles last year. Whereas in 1982 there were 162 enterprises operating at a loss in the republic, in 1983 all enterprises completed the year with profits.

The coordinated work of collectives of agricultural enterprises and of organizations servicing them within the Stavishchenskoye RAPO of Kiev Oblast secured a growth in gross production of 12.5 percent in 1983 as compared with 1982. Gross grain yield increased by 6.5 percent and milk production increased by 22 percent. Proceeds of enterprises from increasing the volume of agricultural products sold to the state and from new prices and supplements to them increased from 29.8 million rubles in 1982 to 41.9 million rubles in 1983. During this time the profits of enterprises increased from 733,000 rubles to 7,169,000 rubles.

The more complete satisfaction of the growing needs of the people as regards food products and the improvement of the well-being of workers in the socialist society--these are the main goals of the communist party and of the Soviet state. In order to realize them the Food Program was developed and is being successfully implemented. The increase in procurement prices for agricultural products and the allocation of enormous resources into strengthening the economies of kolkhozes and sovkhozes will facilitate its more rapid fulfillment.

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## TILLING AND CROPPING TECHNOLOGY

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### USE OF MICROFERTILIZERS FOR RAISING CROPPING POWER OF AGRICULTURAL CROPS

Moscow KHIMIYA V SEL'SKOM KHOZYAYSTVE in Russian No 2, Feb 84 pp 17-20

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/Text/ The role played by microelements in ensuring a normal course for physiological-biochemical processes is so great and diverse that high and full-value yields could not be expected if there was a deficit of them. The balanced use of macro and microfertilizers is a very important problem associated with the use of chemical processes. This present article provides a brief examination of the methods employed in our country over the past 20 years (since 1964) for the purpose of studying and solving certain problems associated with the use of microelements in the production of agricultural products.

In order to ascertain the microfertilizer requirements of USSR agriculture, numerous field tests were carried out with various microelements and in connection with many agricultural crops. The generalized results of the tests carried out with the principal crops in the RSFSR /1-10/ and the Ukrainian, Belorussian, Lithuanian, Latvian and Estonian SSR's /4, 11/ are furnished in Table 1. In all, the data obtained from 5,280 field tests carried out by scientific-research institutes, the geographical network of tests by NIUIF /Scientific Research Institute of Fertilizers, Insecticides and Fungicides imeni Ya.V. Samoylov/ and VIUA /All-Union Scientific Research Institute of Fertilizers and Soil Science/ and by planning-research stations for the use of chemical processes in agriculture.

It has been established that microelements against a background of NPK in the RSFSR, while increasing cropping power by 10-12 percent, at the same time increases the resistance of plants against unfavorable conditions (atmospheric and soil dryness, high or low temperatures and infection by diseases or pests). Microfertilizers accelerate plant development and this is of extreme importance for regions having short growing seasons.

Table 1

**Effectiveness of Use of Microfertilizers for Principal Agricultural Crops in the  
RSFSR, Belorussian, Ukrainian, Lithuanian and Estonian SSR's**

Crop	Increase in Yield (quintals per hectare) From Microelements					
	B	M.	Zn	Cu	Co	Mn
Sugar beets	32.1 (341)	22.7 (203)	32.3 (115)	13.9 (275)	29.6 (116)	27.6 (119)
Flax (haulm)	3.6 (112)	1.2 (18)	4.6 (5)	0.9 (15)	2.7 (8)	2.6 (4)
Flax fibre	0.7 (85)	0.75 (30)	1.2 (15)	0.9 (30)	0.6 (15)	1 (16)
Flax (seed)	1 (63)	1 (8)	0.9 (15)	0.9 (6)	0.9 (15)	1.1 (15)
Wheat, barley (grain)	1.4 (208)	2.1 (241)	2.5 (236)	3.7 (184)	2.7 (112)	1.9 (215)
Potatoes	20.1 (71)	20.2 (105)	23.8 (54)	12.7 (68)	17.9 (109)	27.7 (109)
Fodder beets	3.0 (72)	3.7 (73)	3.9 (62)	3.5 (56)	3.3 (56)	2.3 (54)
Peas	2.8 (75)	2.7 (155)	3.0 (62)	3.0 (62)	2.7 (3)	-
Perennial grasses (fodder)	25.4 (67)	4.6 (70)	17.9 (64)	32 (13)	33.9 (64)	22 (64)
Clover (seed)	0.5 (14)	0.5 (14)	-	0.4 (14)	-	-
Vetch (fodder)	37.3 (3)	8.6 (55)	-	31 (4)	-	-
Corn (fodder)	50.7 (66)	49.2 (70)	43.8 (88)	50.1 (74)	40 (54)	38.5 (62)
Soybeans (grain)	1.3 (17)	1.7 (52)	1.4 (12)	-	-	-
Corn (grain)	-	1.3 (18)	5.2 (220)	-	-	2.8 (51)
Rice	3.2 (11)	-	4.2 (9)	4.8 (17)	-	3.2 (7)

Note: The numbers in parentheses indicate the number of tests

Boric superphosphate increased the sugar beet root yield (123 tests) and also the sugar content of the roots from 0.2 to 0.4 percent and, as a result, an average of 3.2 additional quintals of sugar were obtained from each hectare.

In the case of pre-sowing treatment of seed with microelements (123 tests), the wheat and barley grain yields increased by 1.3-2.4 quintals per hectare, grain corn -- to 6.8 quintals per hectare and flax haulm -- by 4.3 to 66 quintals per hectare. The pre-sowing treatment of pea and clover seed with ammonium molybdate produced a net profit per ruble of expenditure of 7.7-7.8 rubles. When a foliar top dressing was applied to grain crops using microelements, jointly with nitrogen fertilizers, the grain yield increased by 2.5-3.0 quintals per hectare.

The use of microelements in the Ukrainian SSR (according to data obtained from 520 tests) constitutes a large reserve for raising the cropping power and quality of various agricultural crops. Zinc-containing fertilizers furnish stable and high increases in grain corn yields (4.7 quintals per hectare, 147 tests). The use of manganese, boron, zinc and cobalt for sugar beets ensures an increase in yield of 15-31 quintals per hectare. According to the data obtained from 100 tests, applications of copper, zinc, molybdenum, boron and manganese to winter wheat sowings make it possible to obtain 1.1-2.1 additional quintals of grain per hectare. Molybdenum increased the pea grain yield by 3-5 quintals per hectare (62 tests).

During tests carried out mainly on sod-podzolic soils in the Belorussian, Latvian, Lithuanian and Estonian SSR's, it was established that the effectiveness of boron, copper and zinc is higher on soils having a weakly acid and neutral reaction and lower on acid soils. At the same time, molybdenum fertilizers on weakly acid and neutral soils ( $\text{pH(KCl)} 6-7$ ) are less effective than on acid soils ( $\text{pH(KCl)} 4.6-5.5$ ).

As a general rule and as borne out by the field tests, the use of microelements against a background of complete mineral fertilization (NPK) is highly effective.

The positive effects of microfertilizers were observed for a majority of the agricultural crops grown in various zones of the country. However, it bears mentioning that comparatively little data is available on the use of microfertilizers with rice. In the USSR and also in international practice, rice growing on the whole is often characterized by a high degree of effectiveness of zinc fertilizers and also copper, boron and manganese.

The results of studies have made it possible to expand the group of agricultural crops which respond to molybdenum. It turns out that its use is extremely effective for sugar beets, corn for green feed, flax, grain crops, potatoes and vegetable crops.

A vital problem is that of developing a technology for utilizing microelements. Specifically, the dosages of microfertilizers are dozens and even hundreds of times lower than those for macrofertilizers and the requirements for uniform applications are extremely high. At the present time, microfertilizers are being employed together with macrofertilizers; through the treatment of seed --

with centralized chemical disinfection directly on a farm prior to sowing (dusting, moistening); foliar top dressing applied to the plants.

Microfertilizers produce a maximum increase in yield when they are used on soils that are poor in mobile forms of microelements, with the biological peculiarities of the plants being taken into account. Based upon the results of field experiments and production testing [6, 7], a scientifically sound technology has been developed for using microfertilizers in behalf of various agricultural crops (see Table 2). The methods proposed for applying microfertilizers combine very well with the agrotechnical methods and this serves to reduce expenses considerably.

Table 2

Dosages and Methods for Applying Microfertilizers in Behalf of Principal Crops

Type of Microfertilizer	Dosages (kg of active agent per hectare) and Method of Application			
	To soil prior to sowing	To soil in rows	Foliar top dressing	Pre-sowing treatment of seed
<b>Beets</b>				
B	0.5	0.15	0.12	0.02
Cu	1.0	-	0.08	0.01
Mn	3.0	1.5	0.05	0.01
Zn	3.0	-	0.05	0.01
Co	-	-	0.15	-
<b>Food Roots</b>				
B	0.5	0.15	0.15	-
<b>Vegetable Crops</b>				
B	0.4	-	0.15	-
Zn	1.2	-	-	-
Mo	-	-	0.10	-
Mn	3.0	-	0.05	-
<b>Grains (Wheat)</b>				
B	-	0.2	0.02	-
Cu	1.0	-	0.08	0.06
Mn	3.0	1.5	0.05	0.03
Co	-	-	-	0.20
Zn	3.0	-	0.03	0.65
<b>Pulse Crops (Peas, Beans, Vetch)</b>				
Mo	-	0.05	0.05	0.03
Co	-	-	0.20	-
Zn	2.50	-	0.04	0.01
B	0.50	-	-	-

(Continued...)

(Table 2 continued...)

Type of Microfertilizer	Dosages (kg of active agent per hectare) and Method of Application			
	To soil prior to sowing	To soil in rows	Foliar top dressing	Pre-sowing treatment of seed
Soybeans				
B	0.50	0.15	0.12	0.01
Mo	-	0.05	0.10	0.03
Zn	3.0	-	0.03	0.01
Spinning Flax				
Cu	1.0	-	-	-
B	0.3	0.10	0.10	-
Zn	3.0	-	-	-
Mn	3.0	-	0.05	0.03
Alfalfa and Clover				
Mo	-	-	0.10	0.01
Mn	3.0	1.5	0.05	-
Zn	3.0	-	-	0.01
Co				0.15
Sunflowers				
B	0.50	0.15	0.12	0.01
Buckwheat				
B	0.50	0.15	0.12	-
Hemp				
B	0.80	-	-	-
Cu	1.0	-	0.075	0.03
Co			0.200	
Corn				
Mn	3.0	1.5	0.05	0.01
Zn	3.0	1.5	0.05	0.01
Potatoes				
Co	0.2	-	-	-
Perennial Grasses				
B	0.6	-	-	-
Rice				
B	1.0	-	-	-
Zn	5.0	-	-	-
Cu	5.0	-	-	-
Mn	4.0	-	-	0.05

The country's agriculture has an urgent need for boron, copper, molybdenum, manganese, zinc and cobalt microfertilizers and in a number of zones -- microfertilizers containing iron and iodine.

Studies carried out over a period of many years have revealed the relationship which exists between the amount of mobile forms of microelements in the soil and the response by agricultural crops to microfertilizers. Based upon average indicators /6/, soil groups have been singled out based upon their content of mobile forms of microelements (see Table 3)

Table 3

**Classification of Soils According To Their Content of Mobile Forms of Microelements (milligrams per kilogram)**

Microelement Content	B	Mo	Zn	Cu	Co	Mn
Low	<0.33	<0.1	<0.7	<0.15	<1.0	<30
Average	.34-.70	.11-.22	.8-1.5	1.6-3.3	1.1-2.2	31-70
High	>0.71	>0.23	>1.6	>3.4	>2.3	>70

In accordance with data obtained from soil-genetic inspections and map-diagrams, zonality in the European part of the country is clearly apparent in terms of the content of mobile forms of microelements in the soils. Of 130 million hectares of agricultural land, an extremely low boron content (less than 0.3 milligrams per kilogram of soil) is found in 35.8 million hectares (27.5 percent of the overall area), molybdenum -- 86 million hectares (66.1 percent), zinc -- 115.5 million hectares (93.4 percent), copper -- 69.5 million hectares (53.4 percent), cobalt -- 96.2 million hectares (74 percent) and manganese -- 7 million hectares (5.4 percent). This data emphasizes once again the need for a detailed agrochemical examination of soils for microelements. During the past few years, the country's agrochemical service has commenced this work. Roughly 16.4 million hectares of arable land have been examined. It has been established (and recorded in the cartograms and field ratings for farms) that from 40.1 to 68.2 percent of the arable land is characterized by a low level of mobile forms of boron, molybdenum, zinc, copper and cobalt (see Table 4).

The arable land is mostly lacking in mobile boron -- in Belorussia (71.5 percent) and in the Lithuanian SSR (59.6 percent). In the RSFSR, there are especially large areas of soil lacking in mobile boron in the northern, northwestern and Volga-Vyatsk economic regions (up to 64.8 percent); practically all of the soil in the Latvian SSR (99.5 percent) and the Lithuanian SSR (97.1 percent) lacks molybdenum and also a large portion of the soil in the Belorussian SSR (81.3 percent). Soils which are poor in zinc are especially widespread in the Moldavian SSR (96.6 percent), Ukrainian SSR (99.9 percent), Tajik SSR (88.8 percent), Kazakh SSR (93.4 percent and in the RSFSR (82.3 percent). Soils in which there is very little cobalt occupy large areas in the Belorussian SSR (87.8 percent), Uzbek SSR (57.0 percent) and in the RSFSR (43.6 percent). Many soils in the Belorussian SSR (55.5 percent), the Moldavian SSR (46.4 percent) and in the Estonian SSR (34.4 percent) are characterized by an extremely low amount of mobile copper.

Table 4

Distribution of Arable Soil Areas (% of area inspected) According To Content of Mobile Forms of Microelements (data of USSR Agrochemical Service)

Mobile Forms of Microelements	USSR on the Whole			Including RSFSR		
	Low	Average	High	Low	Average	High
Boron	48.8	23.4	27.8	28.8	38.0	33.2
Molibdenum	60.9	25.7	13.4	52.0	32.4	15.5
Zinc	49.6	26.7	23.7	82.3	13.3	4.4
Manganese	15.8	30.5	53.7	5.5	46.6	47.7
Copper	40.1	30.5	29.4	17.2	36.7	46.1
Cobalt	68.2	23.6	68.2	43.6	42.9	13.5

Table 5

Use and Production of Microfertilizers in USSR Agriculture  
(thousands of tons of active agent)

Type of Microfertilizer	1970	1976	1980
Boron	2.70	4.50	4.29
Boron-magnesium	2.30	2.80	2.80
Manganese	-	-	-
Zinc	-	-	-
Copper	-	-	-
Total	5.00	7.30	7.00

For the country as a whole, the arable soils are adequately supplied with mobile forms of manganese and yet this microelement is lacking in the soils found in the Belorussian, Ukrainian, Azerbaijan and Georgian SSR's.

An expansion in the production of macrofertilizers with microelement additives (simple and double superphosphate with boron, manganese or molybdenum, urea with copper, complex fertilizers -- ammonium phosphate, nitrophosphates and also mixed solid and liquid fertilizers with boron, manganese and molybdenum) is economically profitable, since they guarantee more uniform and complete support for the plants in the form of nutrients. During the 1981-1985 period, the Ministry for the Production of Mineral Fertilizers plans to produce superphosphate, ammophos, nitrosmophoska and potassium chloride with microelement additives. Data on the use of microelements in agriculture during the 1970-1980 period is furnished in Table 5.

Thus it can be stated that the use of microfertilizers constitutes an additional reserve for raising the cropping power of agricultural crops. When we take into account the fact that the Food Program raises the task of increasing the cropping power of grain crops by 6-7 quintals per hectare during the decade, then the national economic importance of the extensive use of microfertilizers is beyond dispute.

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## TILLING AND CROPPING TECHNOLOGY

### EXPENDITURE NORMS FOR FERTILIZER USAGE DURING 12TH FIVE-YEAR PLAN

Moscow KHIMIYA V SEL'SKOYE KHOZYAYSTVE in Russian No 6, Jun 83 pp 62-64

/Article by A.V. Peterburgskiy, doctor of agricultural sciences and I.N. Chumachenko: "Development of Expenditure Norms for Use of Fertilizers During 12th Five-Year Plan"/

/Text/ An all-union coordination conference was held in Moscow in March 1983 for the purpose of developing expenditure norms for the 12th Five-Year Plan for the delivery, storage, preparation and application of mineral and organic fertilizers and also ameliorants. Representatives of the USSR MSKh /Ministry of Agriculture/, Soyuzsel'khozhimiya VPNO, VIUA /All-Union Scientific Research Institute of Fertilizers and Soil Science/ (leading institute), NIIPiN /Scientific Research Institute of Planning and Standards/ of USSR Gosplan (institute coordinator), VNIPTIKhIM /All-Russian Scientific Research and Planning Technological Institute for the Use of Chemical Processes in Agriculture/ and co-executor institutes -- in all approximately 80 individuals -- participated in the work of the conference.

The conference was opened by the deputy chairman of Soyuzsel'khozhimiya VPNO and chief of administration for the agrochemical service of the USSR MSKh V.P. Tolstousov. In his report, he discussed future trends in the use of fertilizers up to 1990 and he emphasized that the economic effectiveness of fertilizer usage will be greatly dependent upon the assortment of fertilizers that is developed. By 1990 and compared to 1975, the savings realized in the turnover and use of fertilizers (owing to an improved assortment), in terms of capital investments and operational expenses, will amount to a considerable sum. This savings will exceed the additional expenses in the sphere of mineral fertilizer production, resulting from a change in their structure and concentration. By 1990 the average nutrient content in fertilizers will have increased and this will ensure a considerable economic effect per million tons of mineral fertilizer delivered.

At the same time, future plans call for the organization, on each farm, of measures aimed at ensuring the complete and efficient use of all organic and other local fertilizer resources and for an expansion in the volumes of prepared compost containing phosphorite meal and lime and other materials.

VIUA, TsINAO /Central Institute of Agrochemical Services for Agriculture/ and other scientific research institutes have developed an assortment of mineral

fertilizers for the future up to the year 2000, with the effectiveness of individual forms in the various soil-climatic conditions being taken into account; the potential of the traditional technological processes and the geography of distribution of raw materials and enterprises of the mineral fertilizer industry; reductions in transport expenditures for shipping the fertilizers from plants to the fields and their efficient use in regions adjoining the production areas.

Professor V.A. Zakharenko (VNIPTIKhIM) and Yu.S. Chamov (NIIPiN of USSR Gosplan) reported on the use of expenditure norms for fertilizers when evaluating the effectiveness of their use and also on the tasks associated with improving the normative base for the future. They noted that improvements in the methods used for the planned management of the national economy are based upon the maximum use of a scientifically sound normative base and thus the development of norms is considered to be an important state task in all areas of production.

A report was delivered by R.M. Okina (VIUA) on the results realized in the development of expenditure norms for the use of fertilizers and ameliorants during the 12th Five-Year Plan. It was stated in the report that the expenditure norms developed by the republic and zonal institutes for the farm use of mineral fertilizers and bedding and non-bedding farmyard manure will be generalized by a leading institute within the established period and presented for approval by the USSR MSKh. Deserving of a high evaluation are works carried out at the Ukrainian NIIEOSKh imeni A.G. Shlikhter, UNIIMESKh /Ukrainian Scientific Research Institute of Rural Mechanization and Electrification/, Kazakhsel'khozmekhanizatsiya NPO /Scientific Production Association/, Kishinev Branch of TsINAo, Far Eastern NIISKh /Scientific Research Institute of Agriculture, SoyuzNIKhI /All-Union Scientific Research Institute of Cotton Growing/ and others.

For further improvements in the development of norms, an expansion should ideally take place in the preparation of materials for works carried out using the resources of Sel'khozhimiya subunits and the quality of the norms for the eastern Siberia economic region of the RSFSR, Kazakhstan, the Urals and Volga economic regions and the Uzbek and Georgian SSR's should be improved.

For individual republics and regions, more thorough justifications are required for the development of expenditure norms for the use of mineral and organic fertilizers, using kolkhoz and sovkhoz resources.

In a report concerning the development of expenditure norms for the use of solid mineral fertilizers and ameliorants, with the aid of equipment provided by Sel'khozhimiya associations, E.I. Smyshlyayev (VNIPIagrokhim) stated that the computations called for the complete passage of the mineral fertilizers through a rail-served base. From the rail-served base, 60 percent of all fertilizers will be delivered to remote storehouses by means of motor transport, with the plans calling for 40 percent to be used directly from the rail-served storehouse. The expenditures for engineering lines of communication are taken into account when determining the capital expenditures for storehouse installations.

The plans call for solid mineral fertilizers and pulverized ameliorants to be applied using the direct-flow and loading systems and weakly pulverized ameliorants -- using the direct-flow and trans-shipping methods with the following machines: RUM-5, RUM-8, RUM-16, MKhA-7, MVU-30, ARUP-10, ARUP-13, RUP-10 and RUP -14. The mineral fertilizers will be delivered to remote storehouses using the machines: KamAZ-55102 + GKB-8527, ZIL-MMA-4506 + GKB-2529, Ural-5557, KamAZ-4440 + GKB-8535, KamAZ-5320 + GKB-8350, ZIL-4331, KamAZ-55113.

In his report, Yu.I. Vakhrameyev (BIUA) discussed the technology for the storage, mechanization and organization of work at mineral fertilizer storehouses and at kolkhoz and sovkhoz points for the use of chemical processes. Inter-farm and farm storehouse complexes are the principal areas for the storage of fertilizers and for preparing them for storage. The overall capacity of the storehouses, depending upon the delivery conditions and the fertilizer application periods, is developed for the one-time storage of 50-60 percent of the annual consumption of mineral fertilizers. Storehouse complexes with capacities of from 800 to 8000 tons of mineral fertilizer are used for the simultaneous storage of 6-7 types and forms of fertilizer. Use is made of the following items of equipment for the mechanization of intra-storehouse operations: PF-0.75 frontal loader, SZU-20 mixer-loader, UTS-30 stationary mineral fertilizer mixing unit, AIR-20 mincer and others. The technical-economic indicators of the storehouse complexes change depending upon the work volumes, the space-planning solution and upon the type of construction structures.

Reports were delivered by V.S. Barova (UNIIEOSKh imeni A.G. Shlikhter) and L.P. Yatchenko (UNIIMESKh) on the development of expenditure norms for the use of fertilizers and ameliorants for the Ukrainian SSR. It is expected that the enterprises of Ukrsel'khozhimiya will carry out 80 percent of the work concerned with applying mineral fertilizers, all transport shipments, all soil improvement work carried out on acid and saline soils and also a large portion of the measures having to do with the use of organic fertilizers.

With use being made of kolkhoz and sovkhoz equipment, the plans call for the carrying out of sowing applications of fertilizer, top dressings to be applied to the agricultural plants during the growing season and the removal of the farmyard manure beyond the limits of the farms. Towards this end the farms require cheap storehouses with small capacities for mineral fertilizers, with the total volume amounting to roughly 10 percent of the delivery volume. The principal bulk of the mineral fertilizers should ideally be stored at remote mechanized storehouses. Each rayon association of Sel'khozhimiya in the republic must have one central rail-served base (rail-served agricultural complex) and 2-4 remote storehouses. Packaged fertilizers are best stored at rail-served storehouses that are properly equipped with the necessary loading and unloading mechanisms. Experience reveals that this serves to ensure the most efficient use of equipment, with minimal expenditures for labor and resources and with minimal personnel requirements.

The concentration of the storehouse economy within the Sel'khozhimiya system and the proper placement of the rail-served and remote storehouses will make it possible to reduce expenditures for capital investments for mineral fertilizer storage to 38 percent.

Based upon the planned volumes and the procurement areas for the organic fertilizers and also upon an analysis of the actual data on the use of mechanization equipment, the work volumes were determined for the utilization of all types of organic fertilizers. The plans called for solid organic fertilizers to be applied using the direct-flow, trans-shipping and twin-phase systems, with the work being carried out by large-freight trailer-spreaders (PRT-10, PRT-16).

The resource expenditure norms for the use of organic fertilizers during the 12th Five-Year Plan have been increased somewhat as a result of an increase in the construction costs for farmyard manure storehouses, a change in the prices for large-freight trailer-spreaders and the introduction of an operation associated with the intra-soil application of liquid manure. Labor expenditures have decreased by 16-17 percent as a result of the use of powerful tractors and heavy-tonnage machines.

Responsible officials delivered interesting reports on the development of expenditure norms for the use of fertilizers and ameliorants for the republics and economic regions. Recommendations were introduced for improving the method for determining the norm indicators for the 12th Five-Year Plan.

In all, approximately 30 reports and lectures were delivered.

Those who participated in the conference noted that, despite the great complications in the work caused by a number of objective factors, the development of the norms must be completed within the established period and presented to the USSR Ministry of Agriculture for coordination and approval. A decision concerning individual organizational problems was adopted during the conference and methods were outlined for eliminating the shortcomings noted in the carrying out of studies.

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## FORESTRY AND TIMBER

### MORE PRODUCTION WITH LESS LABOR EXPENDITURE IN KAZAKH TIMBER PROCESSING

Tselinograd FREUNDSCHAFT in German 20 Mar 84 p 1

[Article by Woldemar Heinz, chief of the Planning and Economic Department of the Ministry of Timber and Wood Processing KaSSR: "More Is Being Produced With Less Expenditure"]

[Text] The timber and wood processing industry are [as published] developing rapidly. Within a relatively short period, the output of furniture has increased by a factor of 2.5. The considerable work tempo is being continued during the current five-year-plan--in the three past plan years the increase in furniture production amounted to 121.5 percent.

In the development of this industry, the emphasis is being placed on the reconstruction, expansion and technical retooling of the enterprises and enterprise departments. During the 10th Five-Year-Plan alone, 60 mechanized and semi-automated production lines for timber sizing, veneering, polishing and for the aftertreatment of furniture parts have been installed and put into production. Thanks to technical remodeling, we have reached a considerable tempo with respect to the increase of labor productivity. In the last two past five-year-plans it increased by a factor of 1.7 and since the beginning of the current plan period it has increased by 18.2 percent. During the three past plan years, we attained almost the entire production increase thanks to the increase of labor productivity and consequently without increase of the number of employees. Such production associations as Alma-Ata Furniture, Chimkent Furniture, and Karaganda Furniture, the Ust'-Kamenogorsk Furniture Combine, and others, with a production volume of 13 to 30 million rubles a year, attained the entire increase with a constant number of employees. This confirms anew the advantages of large-scale production and the possibility of making better overall use of the modern equipment in the secondary installations and production departments.

However, the installations will not run by themselves. Technical progress, after all, does not consist only in the quantitative and qualitative improvement of the installations, but above all in their competent utilization and in the organization of a stable production rhythm. Where the collective is morally and materially interested in the results of the economic activity of the enterprise, where the social and personal interests are in harmony with one another, the conditions for increasing the production output through an increase of labor productivity are present.

How do we attain this in practice? The aim and object of everything is planning. The plan must have specific goals. The planning is preceded by a careful analysis of the accumulated work experience of the past years. A constant monthly control of plan realization in all of its parts was organized in the ministry. On a daily basis we receive information about the work results of the past day in all of the most important plan figures by every association and every enterprise.

To increase the production volume, the employees of our industry, in a particularly active manner, are introducing the progressive Shchokino-Method, after publication of the new instruction for its use. At the present time, all enterprises are assessing the experience of the workers of Shchokino. There were enough sceptics who had doubts about the use of this method in furniture production, in the processing and procurement of timber. In the beginning there were tenacious arguments to the effect that in this case it is impossible to combine work operations because of the fixed installations and the lack of an automatically guided technology.

But the results convinced us otherwise: With production remaining constant or even growing, the enterprises employ fewer workers, resulting in wage economies which ultimately are allocated to the material incentives fund.

We also ascribe great significance to the brigade form of work organization and payment, which is the basic form of production management and was invented by the masses themselves. In our industry about 77 percent of all employees are encompassed by the brigade form of work. In the introduction of this progressive method, we are placing the main emphasis on the improvement of qualitative composition of the brigades, on the determination of the optimal number of members, and the perfection of planning. The shift tasks are allocated to the brigades taking into account their obligations; this gives the latter a material basis, and the above-plan production receives a concrete purchaser. The fulfillment of socialist obligations is completely secured through economized material-technical, energy, fuel and labor resources.

It was our industry which was among the first to apply the index of the normative net product. This, of course, required a scientific justification of the work norm, which is necessary for the manufacture of the respective product, as well as an exact justification of the profit share that is included in the normative net product.

The 2-year long experience with its application brought to light its positive, as well as its negative aspects.

The positive aspect is that the collective--regardless of the price of the product, which can depend on expensive raw materials and materials, to whose production it is not related at all--fulfills the plan for assortment in accordance with the contract concluded with the consumers.

But in practice negative elements also came to light, which did not stimulate the reduction of labor expenditure, i. e., to produce the planned output with less manpower. And the reason for this, most likely, is not to be found in

the normative net product, but in the form of the application of this index. Let us take the following example. During the past year, the volume of this net product was calculated in accordance with norms for timber tare and there are hundreds of thousands of these. At the beginning of the year, an automatic press for the manufacture of this very tare from plastics. Here the expenditure of manpower amounted to barely half of what a wooden box required for its manufacture. But the problem was that the normative net product for the plastic drawers, too, was only half. But we did not need any expansion in the manufacture of drawers.

There are sufficient means which stimulate the fulfillment of the plans with less manpower. One of the most important is the introduction of the achievements of scientific-technical progress. At the present time, 41 percent of all employees in our industry are still performing their work manually. For this reason we have--in accordance with the decision of the State Committee for Labor and Wages KaSSR and the Kazakh Republic Council of Trade Unions "On the More Rapid Development of Comprehensive Target Programs for the Reduction of Manual Labor"--developed such a program for every enterprise and a comprehensive one for the entire ministry for the years 1986 to 1990 and for the period to 2000.

The systematic work brought about that the unproductive losses of working time and the fluctuation of personnel decreased noticeably in recent times. The employees of the industry are steadily searching for ways of increasing labor productivity and increasing the production volume. As response to the decisions of the December (1983) Plenum of the CPSU Central Committee, the obligation was assumed to increase labor productivity by 1 and more percent above the plan and, in addition, to lower production costs by 0.5 percent.

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